

Chapter 4. Analysis

This section presents the subarea and corridor-wide analyses along State Route 6 (SR 6) based on the projected future conditions. The future baseline traffic volumes were developed to determine the expected operations of the study corridor in 2020 under the baseline conditions described in Chapter 3 (Future Conditions).

Analysis was performed to identify access management deficiencies and to identify potential improvements and policy options along the SR 6 corridor. SYNCHRO, SIMTRAFFIC, and ARTPLAN software were used to analyze travel conditions along SR 6, as applicable. All analyses included programmed projects and future traffic volumes forecasted based on the ARC travel demand model.

Two formal stakeholder meetings and four small group meetings (one for each county) were conducted for this study. The first stakeholder meeting was held on May 22, 2014, to introduce the study and gather local knowledge and guidance from the stakeholders. Smaller group meetings were conducted for each county separately with local agency and county staff involved where issues specific to the county were discussed. A second large stakeholder meeting was held on October 24, 2014, to discuss preliminary study results, as well as corridor goals, objectives, and vision. The recurring issues that the stakeholders identified for the corridor included congestion, vehicle and pedestrian safety, lack of access management, and lack of frontage roads and inter-parcel access.

This chapter evaluates various potential improvements within key subareas and for the entire SR 6 study corridor. The locations of these subareas and the potential improvements were identified based on stakeholder input and the needs identified in the existing and future conditions analysis. **Figure 4-1** shows selected locations of these subareas in each county. The analyses focused on three elements:

1. Deficiencies that may arise due to future development
2. Major access management improvements – frontage roads, alternative routes, etc.
3. Minor access management improvements – restricted left turns, indirect left turns, spacing of median breaks, consolidation of driveways, raised medians, etc.

Subarea recommendations and overall corridor-wide recommendations were then developed based on the results of these analyses.

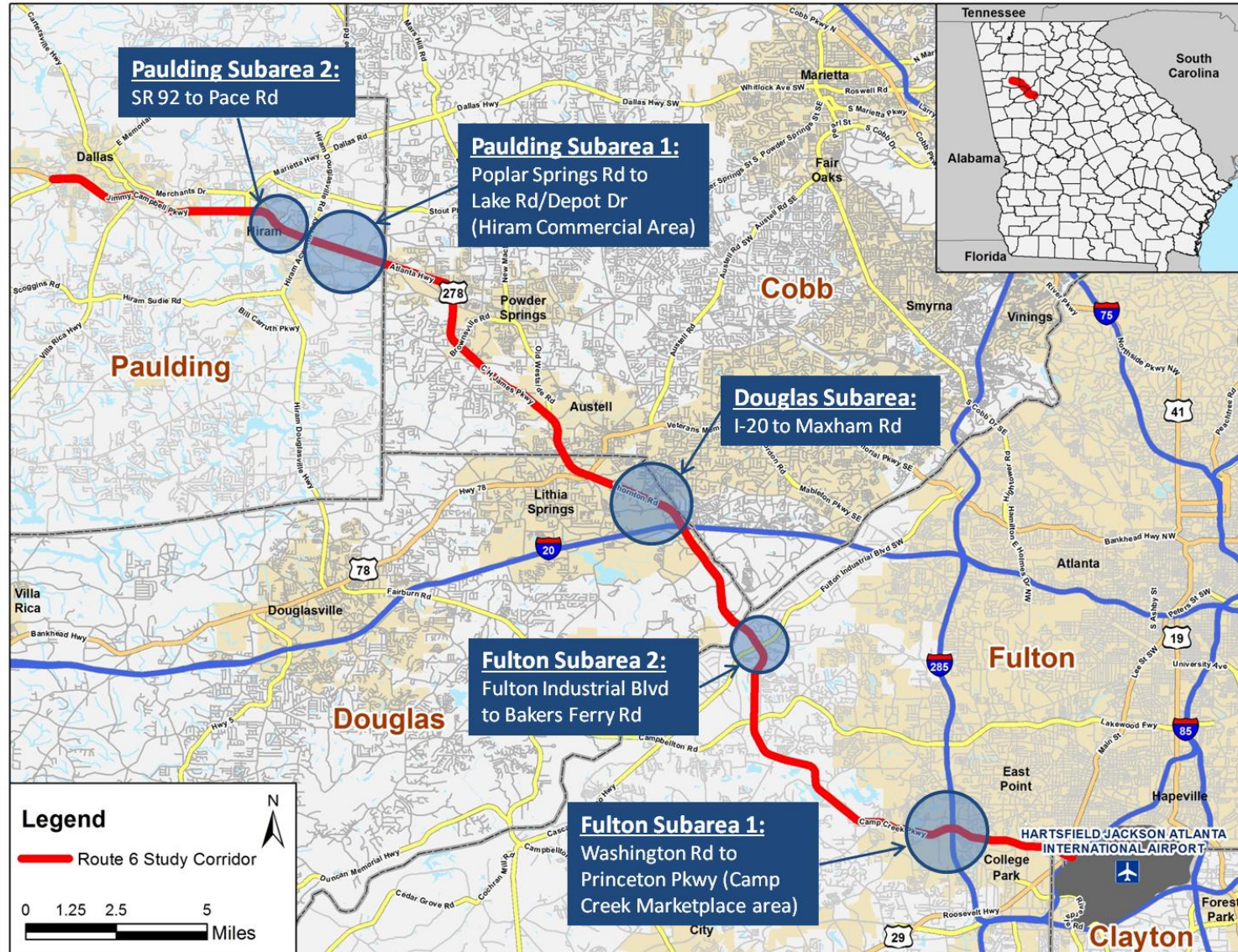


Figure 4-1: Subarea Overview Map

Part A – Subarea Analysis

4A. Fulton County

Based on stakeholder input, the subareas identified for in-depth analyses included: (1) the study area between Washington Road and Princeton Lakes Parkway, including the I-285 interchange and Camp Creek Marketplace, and (2) the study area in the vicinity of SR 70/Fulton Industrial Blvd. and Bakers Ferry Road. Both quantitative and qualitative analyses are included for the selected subareas. The quantitative evaluation examines the impacts of potential improvements on the performance of the SR 6 corridor using Highway Capacity Manual (HCM) methodologies. The qualitative evaluation focuses on potential safety and operational improvements and discusses the possible advantages and disadvantages for businesses and through traffic.

4A.1. Fulton Subarea 1: Washington Road to Princeton Lakes Parkway (Camp Creek Marketplace Area)

This subarea includes the Camp Creek Marketplace area along the SR 6 corridor. The section adjacent to SR 6 is currently fully urbanized with retail development. The areas just beyond Camp Creek Marketplace are still vacant and have potential for future development as identified in **Figure 4-2**. This subarea also includes the SR 6 and I-285 interchange, which is being redesigned by GDOT as a diverging diamond interchange (DDI). This project is currently in concept phase and is programmed to be let for construction in the next few years. Based on the existing conditions analysis, stakeholder feedback, and site visits conducted during this study, the selected Camp Creek Marketplace subarea does not have significant access management or driveway spacing issues. However, the close spacing between the Marketplace and the I-285 interchange creates congestion and adding any potential new development to this area could further degrade the operations of the corridor in this section. The subarea analysis also identifies alternative routes to SR 6 in the area to relieve traffic congestion on the SR 6 corridor. **Figure 4-2** shows the subarea along with potential improvements for the area, and **Table 4-1** provides a summary of the improvements.

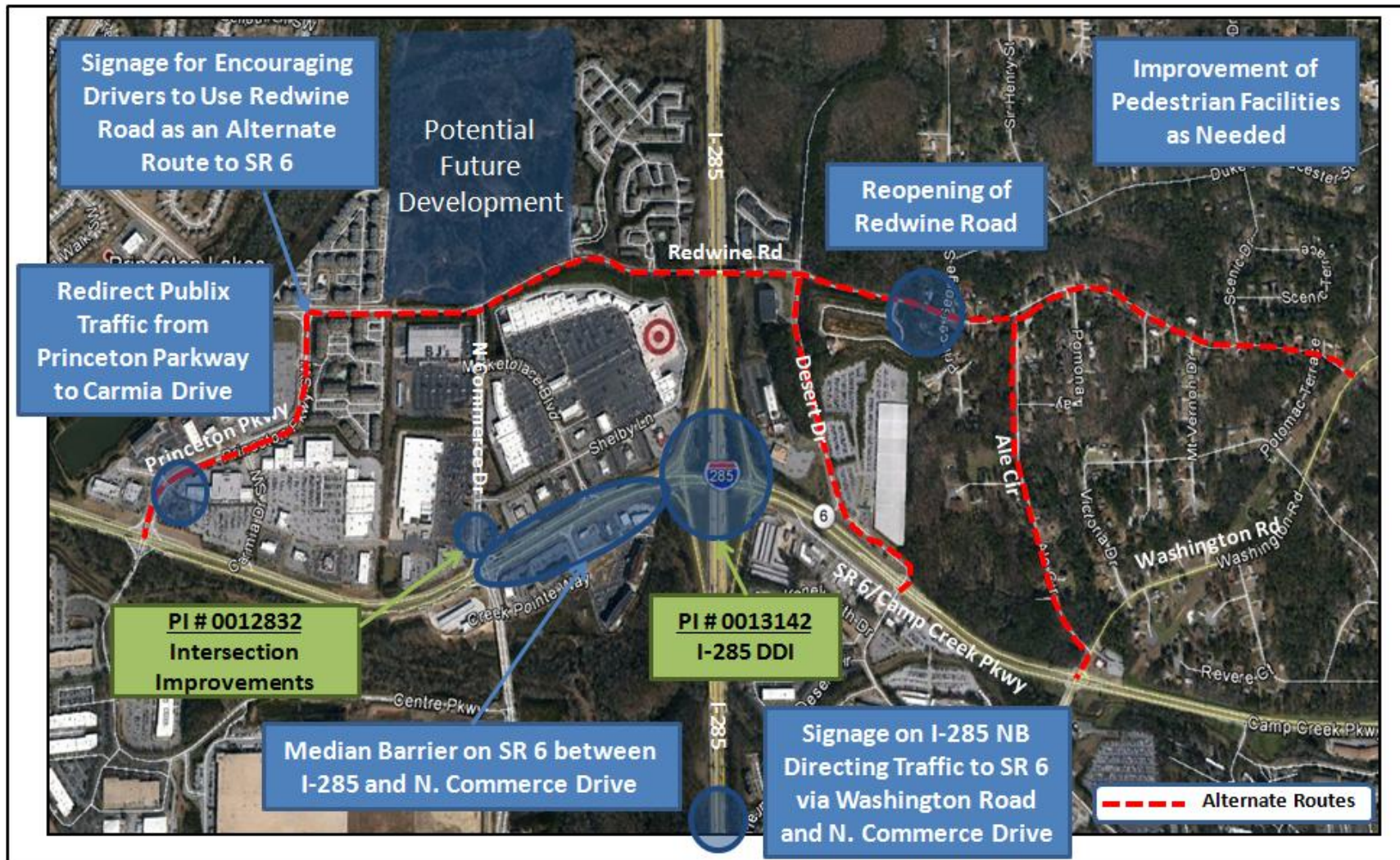


Figure 4-2: Improvements Evaluated in Fulton County Subarea 1: Washington Road to Princeton Lakes Parkway

Table 4-1: Potential Improvements in Fulton County Subarea 1

Potential Improvement	Issue/Concern	Description of Improvement
Re-open Redwine Road west of Prince George Street	Disconnected road section	Reopening the small section of Redwine Road would provide a reliable alternative to SR 6 for the entire Camp Creek Marketplace area from Washington Road to Princeton Lakes Parkway.
Install signage between Washington Road and Princeton Lakes Parkway	Lack of driver information on possible bypass route to SR 6	Implementing signage would provide alternative route information to drivers from SR 6 to existing/reopened Redwine Road.
Provide intersection improvement at N. Commerce Drive intersection, increase storage length of the westbound dual left turn lanes	High U-turn volumes	Increasing storage length of the dual left-turn lanes at the intersection would better accommodate high U-turn volumes and improve the operation of the intersection.
Improve pedestrian facilities in Camp Creek Marketplace area	Pedestrian concerns	Improving pedestrian facilities would provide better accommodation in this high-pedestrian-activity area.
Provide a median barrier on SR 6 between I-285 and N. Commerce Drive	Drivers crossing the median	A physical median barrier would be provided in order to encourage the drivers on SR 6 to use the N. Commerce Drive intersection for making turns instead of crossing the median.
Install signage on I-285 northbound directing traffic to SR 6 via Washington Road	Lack of driver information on an alternative way of access to SR 6	Signage would be provided on I-285 northbound south of Washington Road exit to direct traffic to SR 6 via Washington Road and N. Commerce Drive.

Re-Open Redwine Road West of Prince George Street

Redwine Road can be accessed from SR 6 at Washington Road, Ale Circle, Desert Drive, N. Commerce Drive, and Princeton Lakes Parkway. Currently, Redwine Road is closed between Desert Drive and Prince George Street, thus restricting through movement along Redwine Road from Washington Road to N. Commerce Drive. Reopening this small section of roadway would provide a less congested alternative to SR 6 for the entire section. However, at this time the reason for the closure, along with related documentation, could not be determined. In addition, reopening this road is heavily dependent on coordination between the City, County, and State. Should Redwine Road be reopened at its current closed section, it could be signed as an alternative route for SR 6 between Princeton Lakes Parkway and Washington Road. Even if the current closure of Redwine Road remains in effect, this potential alternative route could benefit several intersections by redirecting local traffic through the alternative route via Desert Drive.

Install Signage Encouraging Drivers to use Redwine Road as an Alternative to SR 6

The existing alignment of Redwine Road on the north side of the Camp Creek Marketplace development provides the unique opportunity to implement a bypass route for SR 6 with relative ease and with minimal costs. If this alternative route were signed, it would enable trips to/from the Camp Creek Marketplace area to be diverted away from multiple signals and congestion on SR 6. This would also allow local traffic accessing these driveways to be routed away from the I-285 at SR 6 DDI, thus reducing

volume through the DDI and potentially improving operations. By taking this alternative route, local motorists could avoid four traffic signals on SR 6 (N. Commerce Drive, I-285 southbound ramp intersection, I-285 northbound ramp intersection, and Desert Drive), thus reducing congestion at these locations. In particular, using this alternative route would alleviate traffic on SR 6 between N. Commerce Drive and Washington Road, which was identified in the existing conditions analysis (Chapter 1) as the most congested section in Fulton County. A high volume of vehicular traffic is noted in this section with the pass-by trips to RaceTrac and Starbucks and accessing Camp Creek Marketplace.

Intersection Improvements for SR 6 at N Commerce Drive

The N. Commerce Drive intersection currently has high westbound left turns with U-turn movements accounting for a significant portion of the volume. The existing storage length for the dual left turn lanes at the intersection is approximately 360 feet. Based on these high U-turn volumes, the intersection could be reconfigured in order to accommodate the U-turn traffic for westbound SR 6. The final storage length of the dual left turn movement could be determined based on traffic volumes that would be served at this location after the construction of the DDI at the SR 6 and I-285 interchange. If this potential improvement is adopted, the final storage length for the dual left turn lanes would need to be verified at the time of implementation.

Operational Analysis of Proposed Improvements in Fulton Subarea 1

The operational analysis for this subarea evaluates potential improvements proposed in this study, in addition to projects that are currently programmed. This subarea includes two programmed projects: I-285 @ SR 6 DDI and SR 6 @ N. Commerce Drive intersection improvement for installing a 3rd southbound lane on N. Commerce Drive. Additionally, the following improvements are proposed for this subarea:

- Signage to redirect some traffic from SR 6 to Redwine Road through connecting streets with or without reopening Redwine Road west of Prince George Street
- Additional N. Commerce Drive intersection improvements for increasing storage length of two left turn lanes on westbound SR 6.

As shown in **Figure 4-3**, SYNCHRO was used to model the existing and potential future conditions and analyze the operational benefits of the improvements. In this process, traffic data was collected at five intersections along Redwine Road, which include Redwine Road at Princeton Lakes Parkway, N Commerce Drive, Desert Drive, and Ale Circle. Traffic data was also collected at Ale Circle and Washington Road to conduct alternative route operational analysis.

The analysis was conducted step-by-step in order to ascertain the effects of each improvement separately. Both arterial level of service for SR 6 and intersection delay at N. Commerce Drive were selected as performance indicators. **Table 4-2** summarizes the arterial level of service analysis for SR 6. In the existing conditions, the arterial level of services (LOSs) for eastbound and westbound SR 6 are LOS D (arterial speed of 20.7 miles per hour) and LOS E (arterial speed of 13.7 miles per hour), respectively.

Without implementing any future improvements, the arterial LOS for westbound SR 6 is expected to decrease from LOS E to LOS F, and the arterial speed for both eastbound and westbound SR 6 would decrease by 2 miles per hour by the year 2020. With I-285 DDI and intersection improvements at the N. Commerce Drive and SR 6 intersection; however, westbound SR 6 would operate at LOS D with approximately 6 miles per hour of increase in arterial speed compared to the existing conditions.



Existing Conditions (2014)



Future Conditions Including Subarea Analysis (2020)

Figure 4-3: Fulton County Subarea 1: Washington Road to Princeton Lakes Parkway (Existing and Future Conditions, Including Subarea)

In order to evaluate the benefits of signage with and without reopening Redwine Road west of Prince George Street, it was assumed that a certain percentage of SR 6 through traffic would divert and use Redwine Road as a bypass. For the purposes of this study, it was assumed that 10 percent of eastbound and westbound SR 6 through traffic would divert to Redwine Road (as it exists today without reopening the section west of Prince George Street) when signage is implemented between Desert Drive and Princeton Lakes Parkway. With the reopening of Redwine Road west of Prince George Street and the provision of signage, 15 percent of eastbound and westbound SR 6 through traffic was assumed to use Redwine Road as an alternative route between Washington Road (via Ale Circle) and Princeton Lakes Parkway. These percentages were chosen based on current traffic patterns along the SR 6 corridor (i.e., travel by vehicles between defined origins and destinations within the subarea). Advances in technology, such as GPS and smart phones, can also help drivers find alternative routes and detours to avoid heavy congestion, and the use of such technology is rapidly increasing among drivers. With these assumptions in traffic diversion, added signage informing drivers of the availability Redwine Road as an alternative route would increase arterial speed for both eastbound and westbound SR 6. It is also expected that vehicles diverted to Redwine Road would experience some travel time savings. While eastbound SR 6 would operate at the same LOS (LOS D) with a slight decrease in arterial speed compared to the existing conditions, westbound SR 6 would operate at significantly improved level of service and arterial speed if signage were implemented to redirect traffic to Redwine Road. If signage is applied to encourage drivers to take Redwine Road as is without reopening it as an alternative route, SR 6 westbound would operate at LOS D with more than 7 miles per hour of increase in arterial speed compared to the existing conditions. If Redwine Road is reopened west of Prince George Street and signage is applied directing drivers to bypass the I-285 interchange via Redwine Road between Washington Road and Princeton Lakes Parkway, SR 6 westbound would operate at LOS C with approximately 9 miles per hour of increase in arterial speed compared to the existing conditions. The benefits of improvements are more likely to be reflected in the operations of westbound SR 6 because westbound SR 6 is the critical direction for the PM peak hour, and it is already operating at full capacity in the existing conditions.

The signalized intersection analysis was also performed for the N. Commerce Drive intersection at SR 6, and results are summarized in **Table 4-3**. The intersection is currently failing (LOS F) with control delay of 130.9 seconds per vehicle, and the operation would only worsen by 2020, with an additional 30 seconds of delay per vehicle, if no improvement is applied. The results show that proposed intersection improvements would decrease delay by 7.3 seconds per vehicle at the intersection compared to the existing conditions. If Redwine Road is only partially open as in existing conditions and motorist travel patterns change in response to proposed signage that identifies Redwine Road as alternative route, delay per vehicle would decrease by 23.7 seconds compared to the existing conditions. If Redwine Road is reopened west of Prince George Street and signage is implemented, delay per vehicle would decrease by 28.3 seconds (additional 4.6 seconds) compared to the existing conditions. While the LOS would remain at LOS F, the operation of the intersection would be enhanced resulting from this significant decrease in delay by approximately 30 and 60 seconds compared to the existing and future no-improvement conditions, respectively.

Table 4-2: SR 6 Arterial Level of Service Analysis

	Eastbound SR 6		Westbound SR 6	
	Arterial Speed (mph)	Arterial LOS	Arterial Speed (mph)	Arterial LOS
Existing conditions	20.7	D	13.7	E
2020 PM with forecasted volumes only (no improvements)	18.7	D	11.5	F
2020 PM with forecasted volumes, I-285 DDI, and N. Commerce Drive intersection improvements	18.6	D	19.6	D
2020 PM with forecasted volumes, I-285 DDI, N. Commerce Drive intersection improvements, and signage for Redwine Road as alternative route without reopening of Redwine Road west of Prince George St.	18.8	D	20.9	D
2020 PM with forecasted volumes, I-285 DDI, N. Commerce Drive intersection improvements, signage for Redwine Road as alternative route with reopening of Redwine Road west of Prince George St.	19.1	D	22.5	C

Table 4-3: N. Commerce Drive Signalized Intersection Analysis

	Control Delay* (Seconds per Vehicle)	LOS
Existing conditions	130.9	F
2020 PM with forecasted volumes only (No improvements)	160.9	F
2020 PM with forecasted volumes, I-285 DDI, and N. Commerce Drive intersection improvements	123.6	F
2020 PM with forecasted volumes, I-285 DDI, N. Commerce Drive intersection improvements, and signage for Redwine Road as alternative route without opening of Redwine Road west of Prince George St.	107.2	F
2020 PM with forecasted volumes, I-285 DDI, N. Commerce Drive intersection improvements, signage for Redwine Road as alternative route with reopening of Redwine Road west of Prince George St.	102.6	F

*Control delay and LOS calculated using HCM 2010

Crash Analysis of Proposed Improvements in Fulton Subarea 1

The 0.7-mile segment between Washington Road and Princeton Lakes Parkway was identified as a crash hotspot for the corridor where all five categories of crash rates (fatal crashes, fatalities, injury crashes, injuries, and all crashes) exceed statewide average rates (See Section 2B.4 Crash Analysis). SR 6 within this subarea also has the highest crash rates along the corridor, where the injury crash rate, injury rate, and overall crash rate were 10 to 12 times higher than the statewide averages for the years 2008 through 2012. Fifty-five (55) percent of all crashes in this segment were rear end collisions, and angle and same-direction sideswipe collisions accounted for 18 percent and 16 percent of all crashes, respectively. While an in-depth roadway audit study for this segment would help pinpoint specific issues, the potential improvements evaluated in this section would likely reduce rear-end and angle collisions by alleviating congestion on SR 6 and improving operation of the N. Commerce Drive intersection, the most congested intersection in the segment.

Additional ideas proposed for the Camp Creek Marketplace subarea include:

- The Camp Creek Marketplace area has a high volume of pedestrians with the retail stores and restaurants in the area. Therefore, additional and improved pedestrian facilities would benefit the area. The locations in need of additional sidewalks and crosswalks should be investigated to accommodate pedestrian activities. Encouraging more pedestrian activity by making the area pedestrian friendly can have a positive impact on the businesses located at Camp Creek Marketplace and on the economic vitality of the area as a whole.
- The proximity of the Publix entrance on Princeton Lakes Parkway to the SR 6 and Princeton Lakes Parkway intersection creates weaving issues in this area. The intersection of Princeton Lakes Parkway at SR 6 is expected to operate at full capacity in the future baseline conditions. Restricting direct access from Publix onto Princeton Lakes Parkway would improve operations along Princeton Lakes Parkway near SR 6 by removing weaving movements and potentially improving the operation of the SR 6 intersection with Princeton Lakes Parkway.

4A.2. Fulton Subarea 2: Fulton Industrial Boulevard to Bakers Ferry Road

This subarea is located close to the Fulton/Douglas County line along SR 6. It includes the intersections of Bakers Ferry Road at SR 6, SR 70/Fulton Industrial Blvd (FIB) at SR 6, and Bakers Ferry Road at SR 70/FIB. **Figure 4-4** shows the subarea, along with potential improvements proposed to the area. This area is characterized by high volumes of truck traffic from/to Fulton Industrial Blvd. and resulting congestion at the intersections of SR 6 at SR 70/FIB and SR 6 at Bakers Ferry Road. In fact, the 1-mile section of SR 70/FIB adjacent to its intersection with SR 6 was identified as having the second highest truck counts for non-interstate locations in Georgia (GDOT Classification Data, 2009). **Figure 4-4** shows the subarea along with potential improvements for the area and **Table 4-4** provides a summary of the improvements.

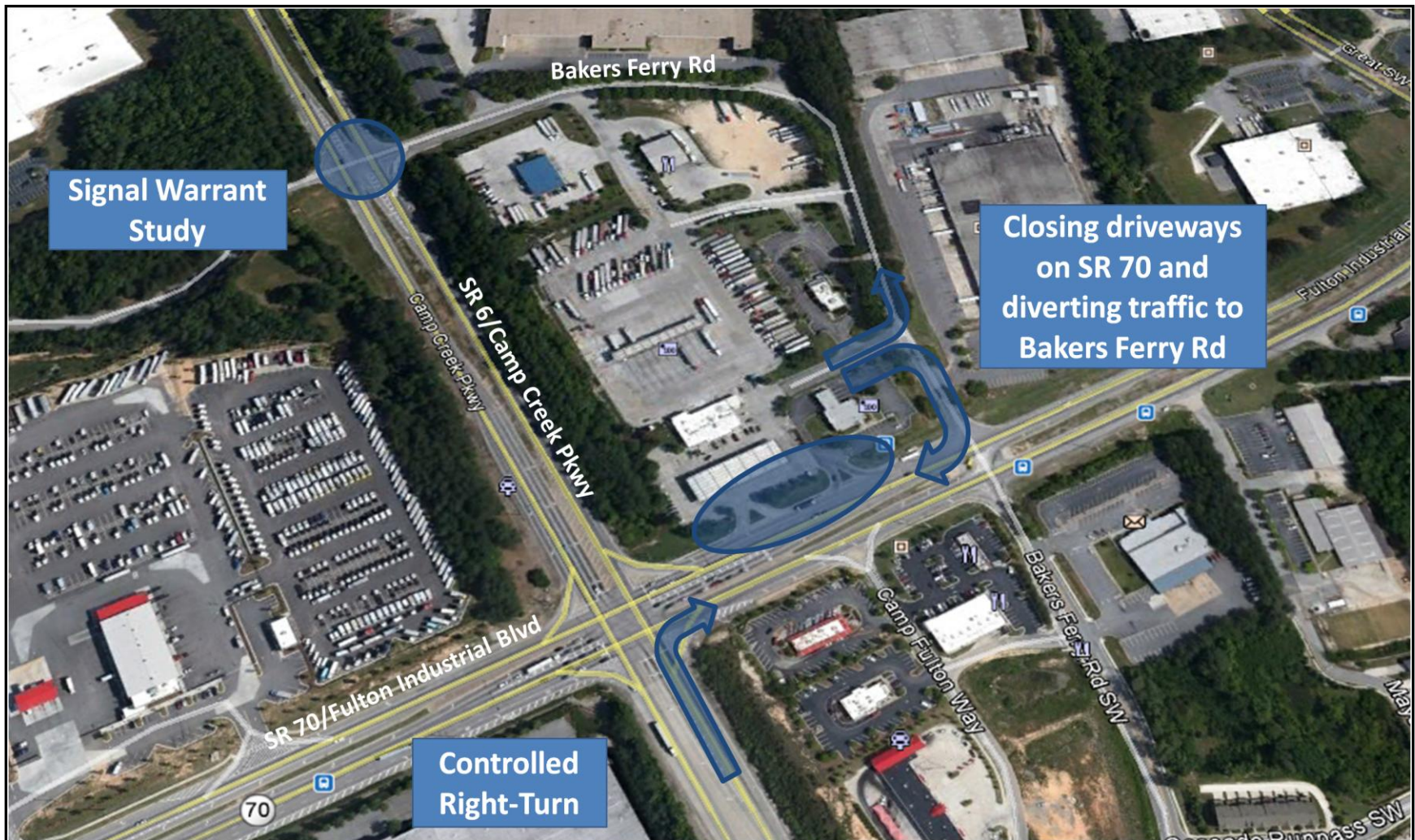


Figure 4-4: Improvements Evaluated in Fulton County Subarea 2: Fulton Industrial Blvd. to Bakers Ferry Road

Table 4-4: Potential Improvements in Fulton County Subarea 2

Potential Improvement	Issue/Concern	Description of Improvement
Conduct signal warrant study for the Bakers Ferry Road intersection with SR 6	Trucks turning to Bakers Ferry Road impeding mainline traffic	Preliminary results indicate that a traffic signal is warranted in the PM peak and would reduce delay at the intersection. Further analysis through a warrant study is recommended to justify installation of a signal.
Provide a controlled right turn for WB SR 6 at SR 70/FIB	Right turning movements on westbound SR 6 conflicting with high U-turn traffic on southbound SR 70/FIB	A controlled right turn signal phase for westbound SR 6 traffic and a possible prohibition of right-turn-on-red (RTOR) would eliminate conflict between right turning vehicles and U-turn traffic from SR 20/FIB.
Remove driveways on SR 70/FIB near its intersection with SR 6	Weaving issues due to multiple driveways nearby SR 6 and SR 70/FIB intersection	Removal of two right-in-right-out driveways would redirect vehicles from the driveways to Bakers Ferry Road for access to SR 6 and FIB and reduce weaving on SR 20/FIB.

Signalization of SR 6 at Bakers Ferry Road Intersection

At the Bakers Ferry Road intersection at SR 6, trucks entering to Bakers Ferry Road block the SR 6 mainstream traffic. Therefore, signalization of this intersection has been identified as a possible solution.

Providing a Controlled Right Turn

For the intersection of SR 6 and SR 70/FIB, a controlled right turn from westbound SR 6 toward SR 70/FIB is recommended because right turning movements from SR 6 result in significant conflicts with high U-turn traffic on southbound SR 70/FIB.

Closing Driveways on SR 70

During stakeholder meetings, the possibility of closing multiple right-in-right-out driveways near the intersection of SR 70/FIB and SR 6 was discussed, which would restrict vehicles coming out of the gas station driveways from accessing the intersection of SR 70/FIB and SR 6. Several sideswipe-type crashes have occurred due to the weaving movement between vehicles exiting the driveways and trying to access the intersection. Closure of these two right-in-right-out driveways would remove this movement redirecting the vehicles from the gas stations and other commercial development along Bakers Ferry Road to access SR 6 from the intersection of Bakers Ferry Road and SR 6. See **Figure 4-4** for the access control measures.

Operational Analysis of Potential Improvements in Fulton Subarea 2

Operational analysis was conducted at these intersections to explore the extent to which intersection delay could be reduced and arterial speed on SR 6 and SR 70/FIB could be increased. A preliminary signal warrant study was first conducted for the intersection of SR 6 and Bakers Ferry Road. The preliminary analysis suggested that this intersection meets the peak hour signal warrant intended for use at a

location where minor-street traffic suffers undue delay when entering or crossing the major street for a minimum of 1 hour of an average day. Further traffic engineering study, including a detailed warrant study, is recommended to confirm justification of installing a traffic signal at the intersection.

In order to conduct a detailed analysis of traffic operations with the closure of the driveways on SR 70/FIB, an existing conditions traffic model was developed using SYNCHRO software. To generate anticipated trips from the QuikTrip gas station and Bank of America driveway, Institute of Transportation Engineers (ITE) Trip Generation 7th Edition was used. The ITE trip generation manual uses number of pumps, square footage, and/or number of drive-through windows to estimate probable trips generated from and to a gas station during a normal weekday peak period. The trips generated were then distributed among the gas station driveways and to Bakers Ferry Road to access either SR 6 or SR 70/FIB in the proposed conditions. The SYNCHRO model was updated for the proposed conditions analysis with the proposed geometry and anticipated trips as shown in **Figure 4-5**. Arterial level of service for SR 6 and SR 70/FIB was selected as a performance indicator.

Table 4-5 summarizes arterial level service analysis for SR 6 and southbound SR 70/FIB. For existing conditions, arterial LOSs for eastbound/westbound SR 6 and southbound SR 70/FIB were all LOS E with arterial speed of 19.3 miles per hour, 16.5 miles per hour, and 16.2 miles per hour, respectively. Without implementing any future improvements, arterial LOSs for both eastbound and westbound SR 6 are expected to decrease from LOS E to LOS F. The analysis results show that intersection improvement and signal modification at SR 70/FIB and SR 6 would not have an impact on arterial speed and level of service. Signalization of the Bakers Ferry Road intersection, however, would increase the arterial speed of westbound SR 6 by 3 miles per hour but at the same time would lower arterial speed of eastbound SR 6 by 6.8 miles per hour compared to the existing conditions. The closure of two right-in-right-out driveways near the intersection of SR 70/FIB would only slightly improve arterial speed of southbound SR 70/FIB.

Table 4-5: SR 6 and SR 70/FIB Arterial Level of Service Analysis

	Eastbound SR 6		Westbound SR 6		Southbound SR 70/FIB	
	Arterial Speed (mph)	Arterial LOS	Arterial Speed (mph)	Arterial LOS	Arterial Speed (mph)	Arterial LOS
Existing conditions	19.3	E	16.5	E	16.2	E
2020 AM with forecasted volumes only (No improvements)	15.4	F	15.6	F	16.2	E
2020 AM with forecasted volumes and SR 70/FIB intersection improvements	15.4	F	15.6	F	16.2	E
2020 AM with forecasted volumes, SR 70/FIB intersection improvements, closing of driveways on SR 70/FIB, and signalization of Bakers Ferry Road at SR 6 intersection	12.5	F	19.5	E	16.3	E

Crash Analysis of Proposed Improvements in Fulton Subarea 2

It is expected that crash rates would decline at the intersection as a result of the removal of the weaving movements that result from vehicles exiting the SR 70/FIB driveways and trying to access the SR 6 at SR 70/FIB intersection within such a short section.

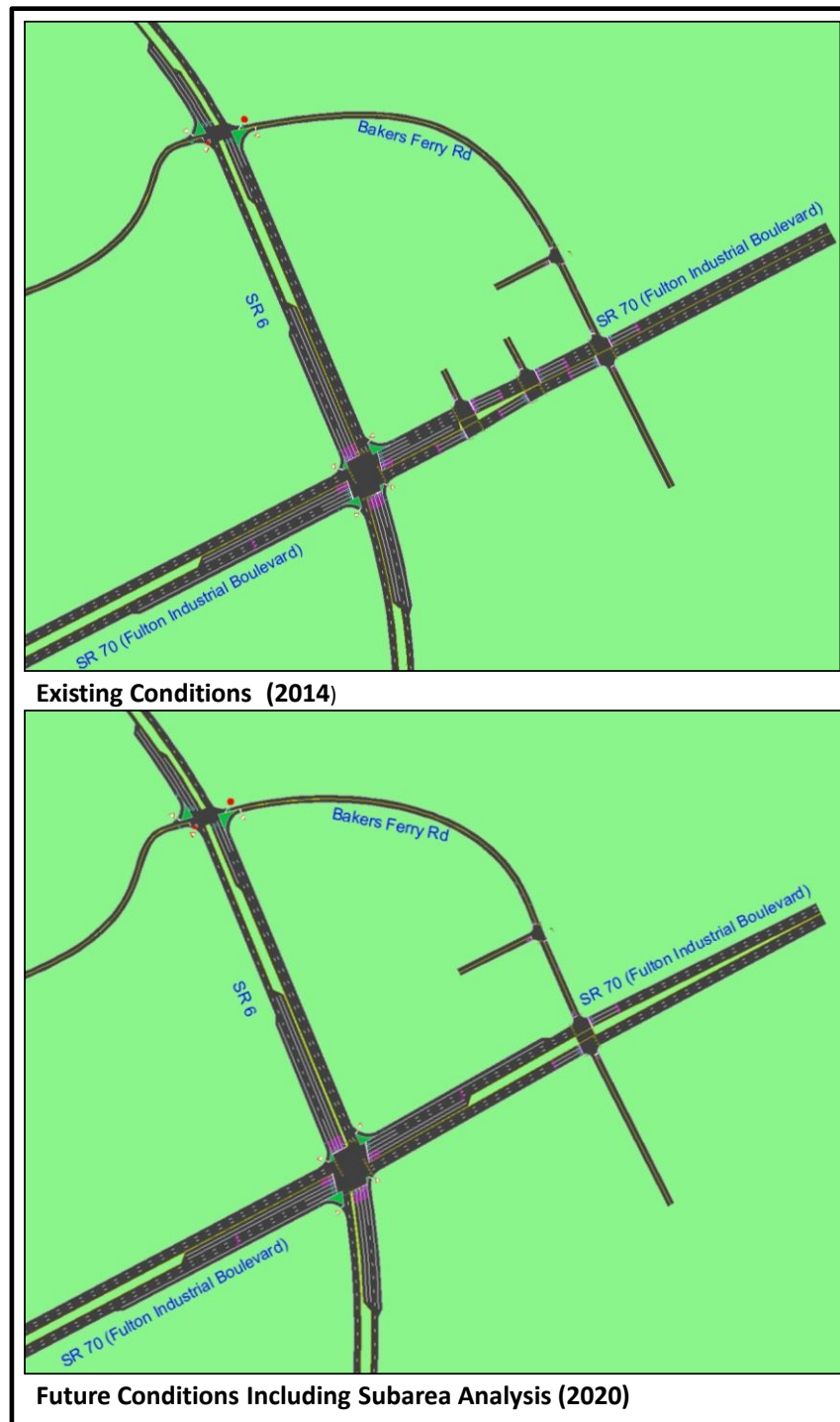


Figure 4-5: Fulton County Subarea 2: Fulton Industrial Blvd to Bakers Ferry Road
(Existing and Future Conditions Including Subarea)

4B. Douglas County

Based on feedback from the Stakeholder Meeting #2, the section of SR 6 between I-20 and Maxham Road (highlighted in **Figure 4-6**) was identified as the subarea for detailed analysis within Douglas County.

4B.1. Douglas County Subarea: I-20 to Maxham Road Area

This section has the highest density of driveways on SR 6 northbound, with concentrations of 19 driveways per mile. This area is also contained within one of Douglas County's Urban Redevelopment Area PlansURP. URPs are plans developed in accordance with Georgia's Urban Redevelopment Act (O.C.G.A. 36-61-1), which gives cities and counties powers to redevelop areas defined as deteriorating or underutilized. The Thornton Road Redevelopment Area includes the section of Thornton Road/SR 6 just north of I-20 to just south of Veterans Memorial Highway.

Additionally, the subarea is within the limits for a congestion reduction and traffic flow improvement project (GDOT PI 0012620). This project extends along SR 6/US 278 from I-20 in Douglas County to Garrett Road in Cobb County and will improve the operations of SR 6 for all users through the implementation of median turn lane improvements, traffic signal modification, overhead signage, and ITS elements. Within Douglas County, improvements comprising extension of northbound and southbound left turns and dilemma zone protection for trucks are proposed at the intersections with Skyview Road, Maxham Road, and Veterans Memorial Highway (Bankhead Highway).

This section of the report describes multiple issues and ideas for the SR 6 corridor in Douglas County, as identified in stakeholder meetings and the analysis conducted as part of this study.

Table 4-6 provides a summary of the potential improvements, and **Figure 4-6** shows the subarea along with potential improvements for the area.

Table 4-6: Potential Improvements in Douglas County Subarea

Potential Improvement	Issue/Concern	Description of Improvement
Conduct a traffic engineering/feasibility study between I-20 WB off ramp and N Blairs Bridge Road	Weaving issues as a result of dual right turn lanes from off-ramp getting in lane for the left turn at N. Blairs Bridge Road	Study would evaluate options to minimize weaving issues between I-20 WB off-ramp and N. Blairs Bridge Road. Possible improvements to reduce/eliminate weaving include prohibition of right-turn-on red, concrete separation of right turn vehicles from off-ramp, and driveway consolidation/reconfiguration.
Consolidate driveways on SR 6 between N Blairs Bridge Road to Crestmark Way	Multiple driveways within section	Improved driveway spacing would reduce traffic turbulence and would in turn maximize capacity.
Reconfigure driveways between Crestmark Way and Oak Ridge Road/Skyview Drive	Multiple driveways within section	Improved driveway spacing would reduce traffic turbulence and would in turn maximize capacity.
Conduct traffic engineering study to evaluate feasibility of alternative design (See Section 4E) for the intersection of SR 6 and Maxham Road	Congestion	Preliminary results indicate that a continuous flow intersection (CFI), parallel flow intersection (PFI), or modified quadrant roadway (QR) intersection are feasible alternative intersection configurations. A further in-depth study for operations and constructability for these options is recommended.
Improve pedestrian facilities (sidewalk, crossings) (see Section 4E)	Pedestrian needs	Sidewalks and crosswalks should be added or expanded. Regulatory pedestrian signs should be installed and effective pedestrian signal timing should be provided at intersections. Landscaping efforts along the median could also be considered to promote safe crossing.

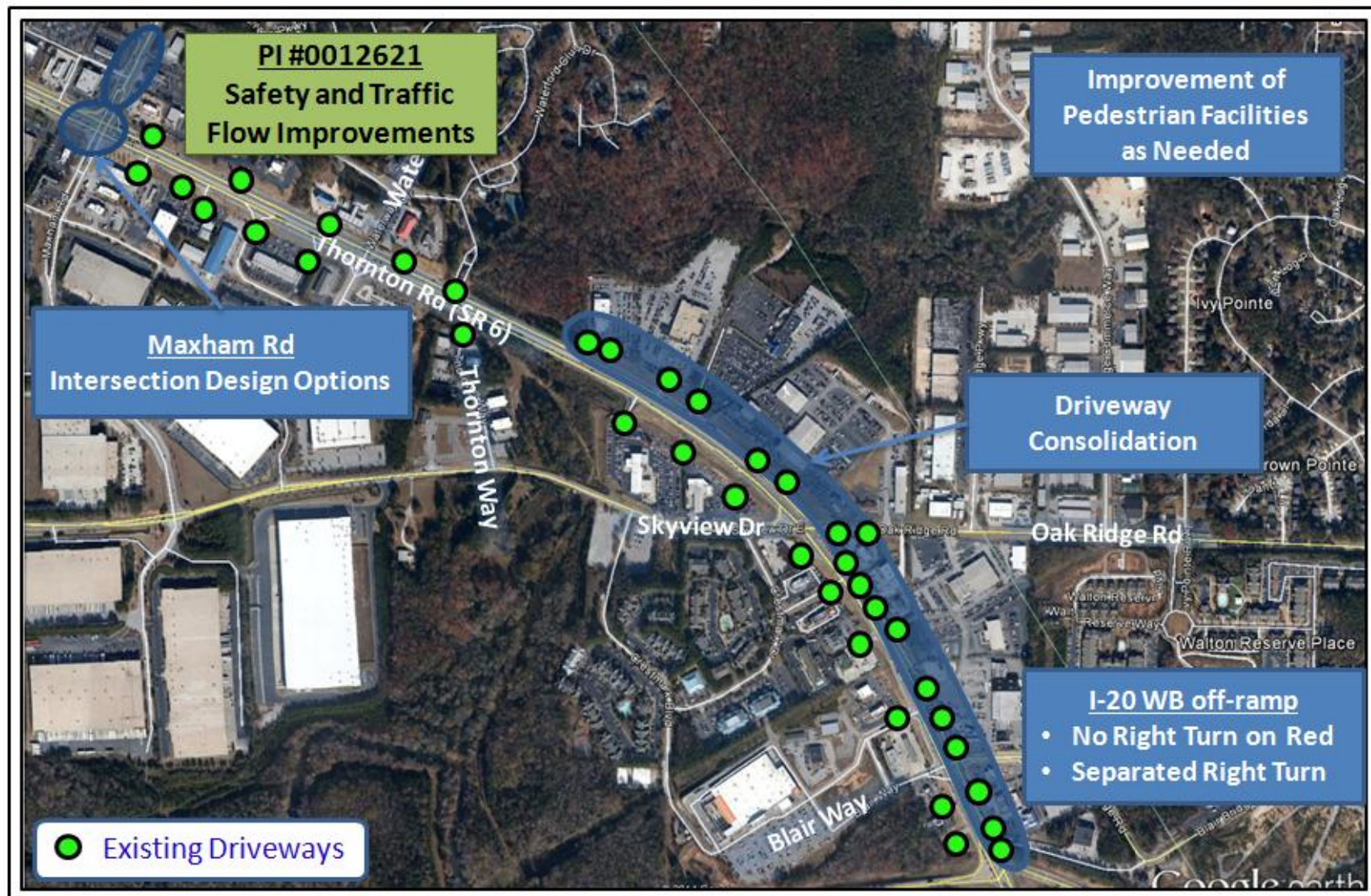


Figure 4-6: Improvements Evaluated in Douglas County Subarea: I-20 to Maxham Road

Weaving Issues, Signage, and Crashes in I-20 Interchange Area

Lack of signage, traffic weaving movements, and crashes near the I-20 interchange were highlighted as major concerns during stakeholder meetings. This could be attributed to the interchange loop design that creates a situation where drivers have to make a right turn to access I-20 WB instead of an “expected” left turn, as is the case with the common diamond interchange designs. Because the congestion reduction and traffic flow improvement project (GDOT PI 0012620) described earlier in the section is expected to alleviate these issues, no additional improvements for this issue are provided at this time.

Weaving Issues from I-20 WB Off-Ramp to N Blairs Bridge Road

Currently, there are weaving issues resulting from vehicles using the dual right-turn lanes from the I-20 westbound off-ramp and then trying to navigate across to turn left at N Blairs Bridge Road (see **Figure 4-7**). Therefore, a concrete separation of the right turn lanes to prevent left turn movement at N Blairs Bridge Road from the off-ramp was considered. However, this option would restrict access to adjacent businesses, such as IHOP and Budget Car Rental on the eastern side and Home Depot and Burger King on the western side. Road signs would have to be provided for vehicles to be routed for U-turns at Skyview Road or left turns through Skyview Road and Crestmark Blvd. to access the western portion of N Blairs Bridge Road. Similarly, vehicles would need to turn right on N Blairs Bridge Road to access businesses on the eastern side of the roadway. Other options that could be considered include the elimination of the second driveway access to the Budget car rental in order to reduce the traffic turbulence in the outer lane. Additionally, right-turn-on-red (RTOR) could be prohibited from the I-20 westbound off-ramp onto SR 6.



Figure 4-7: Subarea Analysis – I-20 WB Off-Ramp to N Blairs Bridge Road

Driveway Consolidation

There are multiple driveways within this subarea, especially along the northbound section as shown in **Figure 4-6**. Based on the posted speed limit of 45 miles per hour, this section of SR 6 requires minimum driveway spacing of 230 feet with no right turn lane and 369 feet with a right turn lane. Existing spacing is significantly less than the required minimum for the two spacing options. Driveways that are spaced too closely can impact traffic operations as a result of right-turn conflict overlap (drivers must monitor more than one right turn merging movement). Additionally, closely spaced driveways can interfere with each other and restrict capacity.

The feasibility of driveway consolidation was examined based on the existing adjacent businesses, as well as traffic counts at specified driveways. The traffic counts showed daily totals of entering and exiting traffic volumes less than 350 vehicles at most driveways and less than 50 vehicles during either peak period with anticipated 2020 driveway volumes of less than 100 vehicles per driveway for the peak periods. Because this section of SR 6 falls within the Thornton Road redevelopment plan area and could see an increase in commercial activity, one-way driveways were also considered as feasible alternatives to closing driveways at various locations. One-way driveways require a 10-foot minimum tangent spacing, considerably less than the required spacing for two-way driveways. One-way driveways would also reduce traffic turbulence and right turn conflict overlap.

Potential improvements for driveway consolidation, reconfiguration, or removal are summarized in **Figure 4-8**, **Figure 4-9**, and **Figure 4-10**.



Figure 4-8: Driveway Analysis – I-20 to N Blairs Bridge Road



Figure 4-9: Driveway Analysis – N Blairs Bridge Road to Crestmark Way

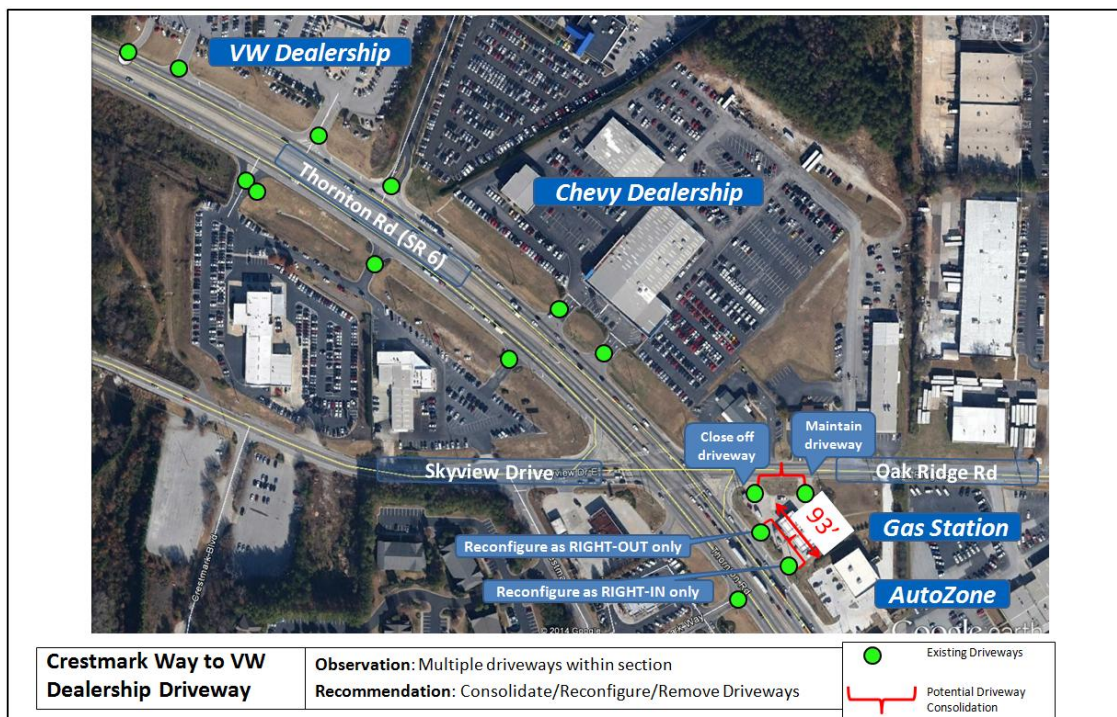


Figure 4-10: Driveway Analysis – Crestmark Way to VW Dealership Driveway

Operational Analysis of Proposed Improvements in Douglas Subarea

A preliminary qualitative assessment indicates that a physical separation of the right turning vehicles and a prohibition of RTOR for vehicles from the I-20 westbound ramp could alleviate the ongoing weaving issues. However, a detailed traffic engineering study would be required to evaluate the traffic patterns along the section between I-20 and Skyview Drive. A study involving the origin-destination patterns of vehicles within the section would facilitate the assessment of the effects of the potential vehicle route diversions that could occur and to determine the efficiency of the options.

Similarly, a qualitative assessment was completed for the driveway consolidation based on the existing and forecasted future volumes. Because this section of the corridor is part of the Thornton Road redevelopment area and could see increased driveway traffic in the future, one-way driveways are recommended to maintain accesses while reducing traffic turbulence in the right lanes.

The congestion at the intersection of SR 6 and Maxham Road is an additional area of concern within this subarea which was highlighted by stakeholders in both Douglas and Cobb Counties. Alternative designs for the intersection are discussed in **Section 4E.3**.

Crash Analysis of Proposed Improvements in Douglas Subarea

It is expected that the overall crash rates along this section of the corridor could be reduced through the reduction or elimination of weaving movements of the right-turning vehicles from the I-20 westbound off-ramp, as well as through the reduction of traffic turbulence in the right lanes as a result of fewer driveway entry points.

4C. Cobb County

Based on feedback from the Stakeholder Meeting #2, no specific subarea for detailed technical analysis was defined for Cobb County. Instead, potential corridor-wide improvements were identified to address the issues mentioned and are summarized in **Table 4-7** and **Figure 4-11**. Additional potential improvements are listed in the corridor-wide analysis section of this chapter (4E and 4F).

Table 4-7: Potential Improvements in Cobb County

Potential Improvement	Issue/Concern	Description of Improvement
Install a raised median for the Cobb County corridor section	Access management	The five-lane section with a two-way-left-turn lane (TWLTL) could be replaced with a raised median in order to maintain corridor continuity and provide separation of traffic flowing in opposite direction.
Providing rain gardens in the center median for the Cobb County section	Drainage and rainfall runoff	The center median could be designed with rain gardens to help with drainage and water runoff.

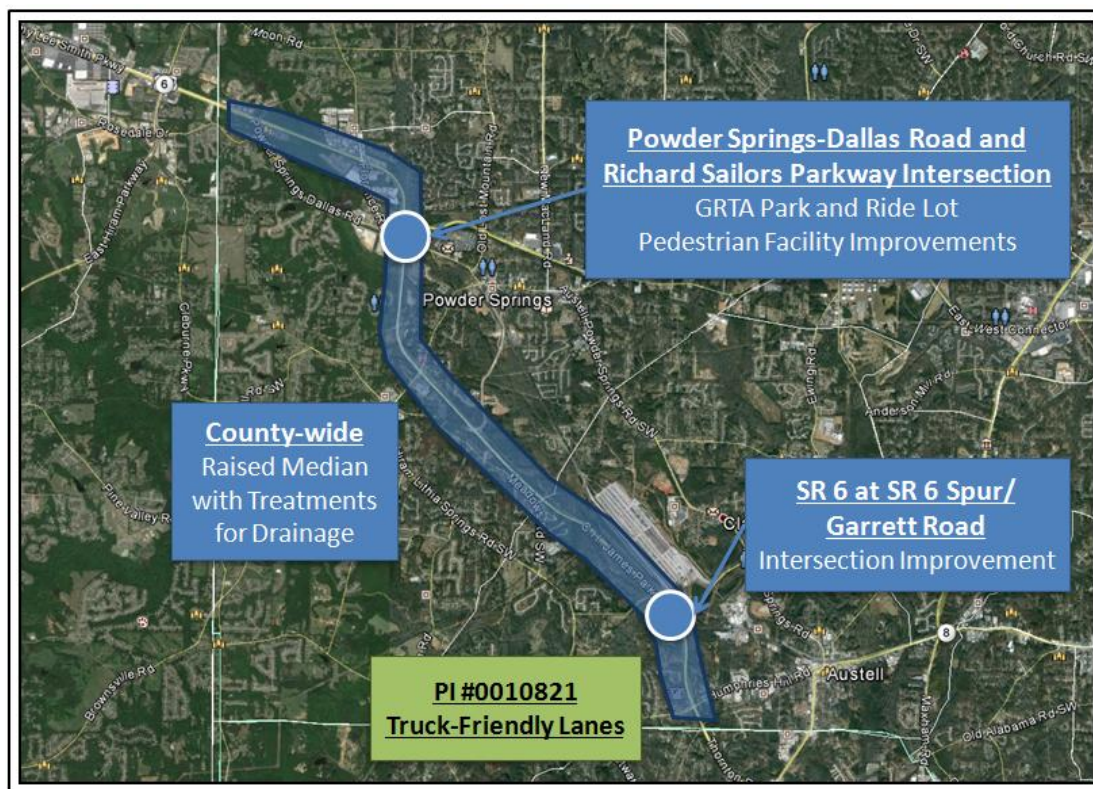


Figure 4-11: Potential Improvements in Cobb County

Within Cobb County, SR 6 is a five-lane section with a TWLTL. The corridor character in this section through Cobb County is less commercial and industrial than in Fulton and Douglas counties. There is a greater concentration of low- and medium-density residential areas, as well as forests, wetlands, and other undeveloped areas. Having a two-way left turn through the corridor has both advantages and

disadvantages. A TWLTL is a lane located between opposing lanes of traffic for the purpose of allowing traffic from either direction to make left turns off a roadway. This type of median treatment is best used in locations where a heavily trafficked urban or suburban roadway has traffic turning left onto side streets or into entrances of business and mid-block entrances are too close to place turn lanes and heavy volumes of left-turning traffic cause backups along the main roadway. However, there are some limitations to TWLTLs that should be considered when evaluating access management strategies. Two of the major concerns are: (1) with a TWLTL, a pedestrian refuge cannot be provided to foot traffic trying to cross the street and (2) the probability of side-swipe and angled crashes involving vehicles getting in and out of the TWLTL is higher than with medians.

Considering existing land use patterns in Cobb County, and also reviewing future land use plans for this section, it can be concluded that the character of the corridor will remain mostly residential with some undeveloped areas and wetlands. Therefore, having a physical median along this section will maintain corridor continuity and also provide much needed separation of traffic flowing in opposite direction. This would also discourage the installation of new traffic signals along the corridor, in turn maintaining through-traffic progression along the corridor. Stakeholders also recommended that the center median be designed with rain gardens, or bioswales, to help with drainage and rainfall runoff, as recommended in ARC's 2008 Connect 6 study. **Figure 4-12** shows an example of the median rain garden treatments.



Figure 4-12: Median Rain Garden/Bioswale Example
(Photo: Aaron Volkeneing, Website of the Soil Science Society of America)

4D. Paulding County

Based on feedback from Stakeholder Meeting #2, the Hiram commercial district was selected for subarea analysis in Paulding County. This area was further divided into two subareas: one in the Hiram Pavilion Commercial District (Poplar Springs Road to Lake Road/Depot Drive) and another near the Walmart between Pace Road and SR 92. Both quantitative and qualitative analyses are included for both subareas. A map depicting the potential improvements in the Paulding County subareas is shown in **Figure 4-13** below.

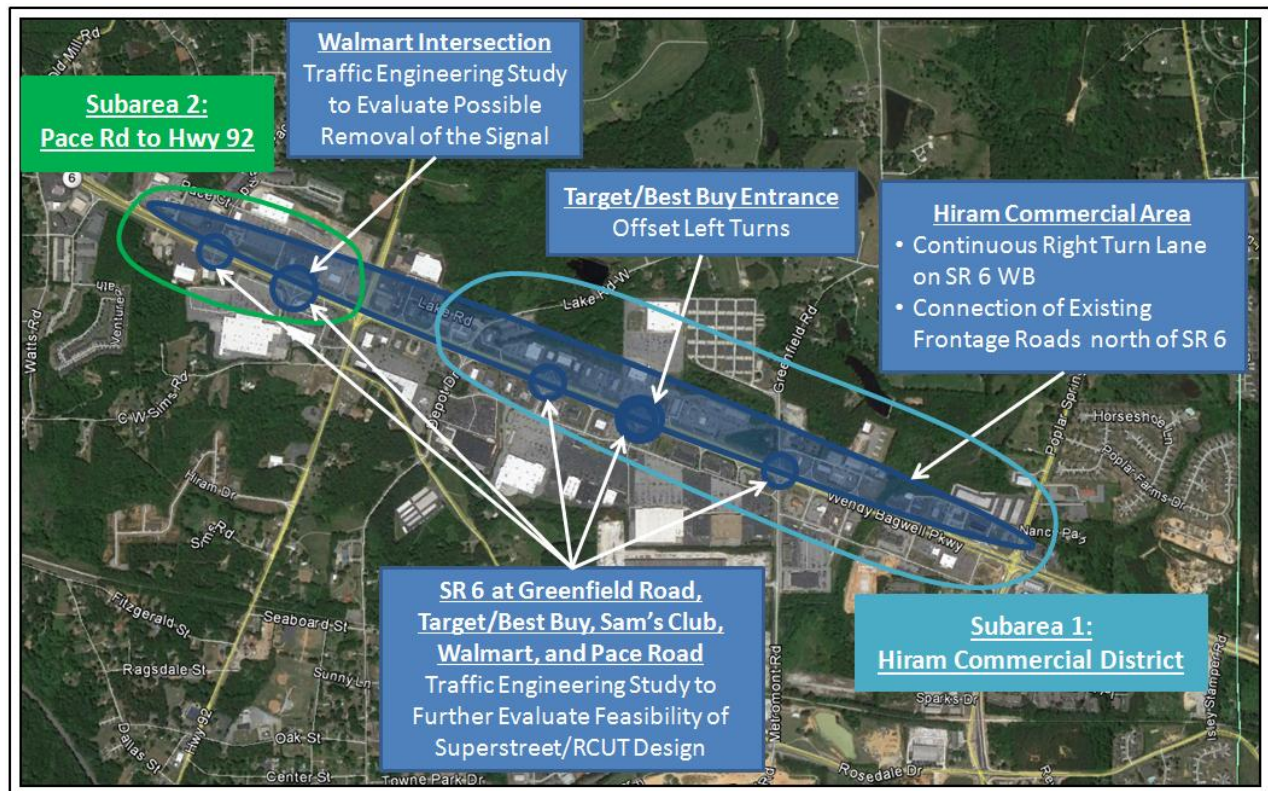


Figure 4-13: Paulding County Subareas

4D.1. Paulding Subarea 1: Hiram Commercial Area

As SR 6 crosses into Paulding County, the commercial development along SR 6 becomes increasingly dense. This area serves as the economic center of the City of Hiram. Shopping, restaurants, hotels, and entertainment venues are all concentrated in this location. In addition to the traffic generated by these developments, SR 6 is also serving as the primary commuter route between Atlanta and Paulding and Polk counties. This combination leads to heavy congestion in the area, particularly during peak hours.

This section describes issues and ideas for Paulding Subarea 1, as identified in stakeholder meetings and the analysis conducted as part of this study. **Table 4-8** provides a summary of the potential improvements for this subarea.

Table 4-8: Potential Improvements in Paulding County Subarea 1

Potential Improvement	Issue/Concern	Description of Improvement
Provide offset left turn lanes at Best Buy/Target intersection	Sight distance and driver expectancy	Widening the roadway into the existing grass median and providing offset left turn lanes would allow the driver to make a more informed decision while making a permissive left turn movement.
Conduct traffic engineering study to evaluate feasibility of alternative designs such as superstreet at multiple intersections (see Section 4E)	Mainline operations	A superstreet, also known as a restricted crossing U-turn (RCUT), is a type of road intersection where traffic on the minor road is not permitted to proceed straight across the major road. All traffic on the minor road must turn right instead, where it can access a U-turn ramp. Identified intersections have relatively higher potential to be considered for a superstreet location. Superstreets are one of the best ways to ensure that mobility on the mainline is prioritized while access from the minor streets is still provided. A feasibility study for super street concept for these locations is recommended.
Conduct study to assess need and feasibility of installing/extending auxiliary lanes at intersections (see Section 4E)	Intersection and mainline operations	Auxiliary turn lanes could be installed at intersections and driveways that do not meet the standard GDOT auxiliary lane requirement. The length of turn lanes should be investigated based on turning volume.
Connect existing frontage roads between Poplar Springs and SR 92 (see Section 4E)	Inter-parcel connectivity	Connecting few existing frontage roads would provide complete inter-parcel access between Poplar Springs Road to SR 92.

The Hiram Commercial Area, between Poplar Springs Road and Lake Road/Depot Drive, provides an opportunity for relatively simple geometric mitigation strategies. The extent of this subarea is highlighted in **Figure 4-13**. For instance, at the entrance to the Hiram Pavilion development, where the Target and Best Buy are located, significant operational improvements could be achieved by widening the roadway into the existing grass median to provide offset left turn movements. At this intersection, turn lanes are not offset, as is the case for all other intersections in the area. An offset left turn lane refers to a lane that is shifted laterally away from the adjacent through lanes, so that opposing left turners do not interfere with one another's sight distances. This allows the driver to make a more informed decision about when to begin the turning movement. The potential for accidents decreases with an offset, and the potential capacity of the intersection increases because more drivers can be served in this movement. The amount of offset provided has an effect on the amount of the sight distance. An example of how offset left turns improve sight distance is shown here in **Figure 4-14**. **Figure 4-15** shows an example of the before and after aerial view of what the changes would look like. Additional options applicable to the subarea such as frontage roads, auxiliary lanes, and alternative intersection designs are discussed in **Section 4E**.

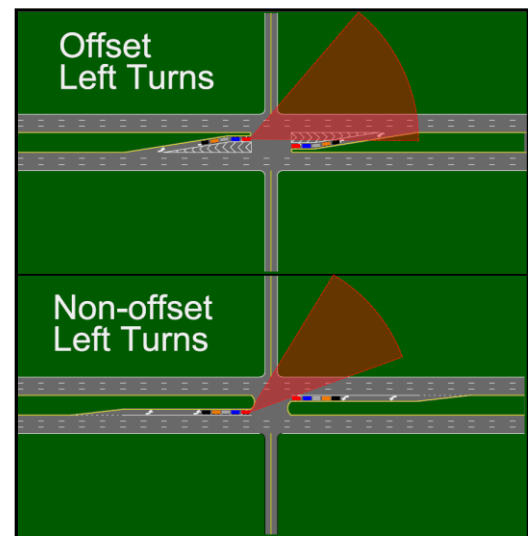


Figure 4-14: Cone of Vision for Left Turns



Figure 4-15: Examples of Intersections without (left) and with (right) Offset Left Turns

4D.2. Paulding Subarea 2: Pace Road to SR 92

Some of the potential improvements related to access management in this subarea would require geometric adjustments to the physical roadway based on existing conditions. The ultimate goal is to promote the safe, smooth, and efficient operation of SR 6. This section describes issues and ideas for Paulding Subarea 2, as identified in stakeholder meetings and the analysis conducted as part of this study. **Table 4-9** provides a summary of the potential improvements for this subarea.

Table 4-9: Potential Improvements in Paulding County Subarea 2

Potential Improvement	Issue/Concern	Description of Improvement
Perform traffic engineering study for removing traffic signal at the Walmart intersection in Hiram	Close spacing of signalized intersections	Preliminary results indicate that removal of the signal and bringing up to the GDOT standard on signal spacing requirement would provide travel time savings for the drivers on SR 6. In addition to the removal of the signal, a grass median could be added and the driveway operated as right-in-right-out only.
Conduct traffic engineering study to evaluate the feasibility of alternative designs, such as superstreet at multiple intersections (see Section 4E)	Mainline operations	Identified intersections have relatively higher potential to be considered for a superstreet location. A feasibility study for super street concept for these locations is recommended.
Conduct study to assess the need and feasibility of installing/extending auxiliary lanes at intersections (see Section 4E)	Intersection and mainline operations	Auxiliary turn lanes could be installed at intersections and driveways that do not meet the standard GDOT auxiliary lane requirement. The length of turn lanes should be investigated based on turning volume.
Connect existing frontage roads between Poplar Springs and SR 92 (see Section 4E)	Inter-parcel connectivity	Connecting a few existing frontage roads would provide complete inter-parcel access between Poplar Springs Road to SR 92.

Signal spacing is the one of the core concerns when implementing access management policies along corridors. Proper spacing of signals restricts unwarranted access points and improves the normal flow of the through traffic. Of the three segments along the entire SR 6 corridor study limits that do not meet GDOT's minimum 1,000-foot signal spacing requirement, two are located on either end of the entrance into the Walmart in Hiram. Due to less than minimum spacing between signalized intersections, several operational issues are observed in this section of SR 6. During congested periods, queues back up into adjacent intersections, limiting access from adjacent driveways and delaying queue clearance on the

mainline. Several improvements including removing the signal, adding grassed median, and making the driveway right-in-right-out only are analyzed in this report. An aerial view of the area with and without these improvements is shown in **Figure 4-16**.



Figure 4-16: Paulding Subarea 2 (SR 92 to Pace Road): Before and After of Signal Removal at Walmart

In this scenario, both westbound and northbound left turns would no longer be possible, eliminating conflicts associated with these movements and potentially allowing for more efficient operation. The right-in-right-out only concept means that drivers wishing to turn left out of the Walmart must instead take a right onto SR 6, and then make a U-turn at the intersection at SR 92 to continue westward. Similarly, a driver approaching from the east wishing to enter the Walmart must enter through the driveway on SR 92, or continue to the Pace Road intersection, make a U-turn, then turn right into Walmart. While it may seem that the number of maneuvers for the drivers accessing Walmart increases with the closure of this signalized intersection, traffic volumes for these movements add to only 6 percent of the total volume at the intersection during peak hours, making these movements operationally possible. However, it is important to consider the effects of weaving vehicles wishing to make a U-turn. Those turning right out of the Walmart entrance intending to perform a U-turn at SR 92 will only have 350 feet of weave distance for a three-lane weave. As per the Highway Capacity Manual, this short weaving distance can make the maneuver uncomfortable for the driver. Thus, this improvement may require addition of a new road behind the auto parts store, as SR 92 may not be able accommodate all the U-turns that would be added.

Operational Analysis of Proposed Improvement in Paulding Subarea 2

To provide a preliminary analysis of the effects of the signal removal, ARTPLAN 2012, an arterial LOS tool that is included in the HCS 2010 software suite by McTrans, was used. It offers planning-level analyses for

arterial facilities based on 2010 Highway Capacity Manual procedures. With basic geometric and volume inputs, it provides reliable estimates of travel speeds and delay through a direction of an arterial segment. Using ARTPLAN as the analysis tool, it is possible to estimate simple operation changes that can occur with the removal of this signal. Using 2012 volumes and signal timing data from directional peak periods, the change in average speed, travel time, and control delay through the segment were analyzed. The results of the ARTPLAN analysis are shown in **Table 4-10** below.

Table 4-10: ARTPLAN 2012 Results for Removal of Signal at Walmart in Subarea 2

Eastbound Travel (AM peak)	With Signal	Without Signal	Improvement (%)
Average Speed (mph)	8.2	8.9	7.3%
Travel Time (s)	131.0	122.0	6.8%
Control Delay (s)	119.6	105.5	11.8%

Westbound Travel (PM peak)	With Signal	Without Signal	Improvement (%)
Average Speed (mph)	17.3	45.3	162.6%
Travel Time (s)	62.6	23.8	61.9%
Control Delay (s)	41.8	3.6	91.5%

The HCM methodology estimates significant operational improvements to SR 6 with the removal of the signal. Travel time savings of up to 45 seconds would result for someone traveling eastward in the morning and westward in the evening. It should be noted that a traffic signal timing update would be needed in this section of subarea between SR 92 intersection to Pace Road intersection with the removal of traffic signal at the intersection of SR 6 and Walmart. Cycle lengths at the SR 92 and Pace Road intersections with SR 6 would have to be updated to accommodate additional U-turn movements. Also, signal coordination and offset timing would have to be revised to accommodate the removal of a signal. Retiming this section of the corridor and removal of the signal at Walmart would improve overall travel time and travel speed within the subarea. Although planning-level analysis shows potential improvement of operations, a more detailed traffic study is recommended to further evaluate the impacts of removing the signal.

Part B – Corridor-Wide Analysis

4E. Corridor-Wide Analysis & Considerations

4E.1. Operational Improvements

Apart from improvements evaluated in the selected subareas discussed in the previous section, several other locations along the corridor were identified as having recurring operational issues and concerns. Proposed improvements for these specific locations are discussed below. **Table 4-11** provides a summary of the potential operational improvements along the corridor.

Table 4-11: Operational Improvements along Corridor

Potential Improvement	Issue/Concern	Description of Improvement
Consider improvements such as extension of left turn lane at Welcome All Road and provision of left turn at Enon Road, signal timing optimization to improve operations at these intersections	High crash rates and high number of red-light-running offenders	In order to improve operations, the extension of the left turn lane at Welcome All Road intersection and the provision of turn lanes at Enon Road intersection are recommended. Signal retiming and additional operational analysis coupled with law enforcement would discourage red-light running.
Conduct study to assess the need and feasibility of installing/extending auxiliary lanes at all intersections	Operations	It is recommended that auxiliary turn lanes be installed at intersections and driveways that do not meet the standard GDOT auxiliary lane requirement. The length of turn lanes should be investigated based on turning volume.
Examine the feasibility of re-opening Merk Road north of SR 6	Intersection geometry	Reopening Merk Road just north of SR 6 would bring this intersection back to a four-leg intersection.
Conduct an operational study at SR 6 and Blairs Bridge Road/Interstate W Parkway intersection	High U-turn volumes	This traffic engineering study would evaluate possible options to minimize weaving issues on SR 6 between the I-20 WB off-ramp and N Blairs Bridge Road.
Perform a traffic engineering study to evaluate options to improve SR 6 at Garrett Road intersection	Truck SB to EB movements	Improved superelevation would allow the trucks to better turn.
Provide a median barrier on SR 6 between Welcome All Road and SR 70/FIB	Drivers crossing the median	A physical median barrier would be provided in order to encourage the drivers on SR 6 to use the intersections for making turns instead of crossing the median.
Provide intersection improvements at Butner Rd at SR 6	Pedestrian accommodations and congestion	Intersection improvements such as turn lane and signal upgrades would improve operations for vehicles and pedestrians.

Intersection Improvements at SR 6 Intersections with Welcome All Road and Enon Road

On SR 6 between Welcome All Road and Bakers Ferry Road, crash rates for the number of fatal crashes (defined as involving at least one fatality) and the total number of fatalities are higher than the statewide average rates for the years 2008 through 2012. A high number of crashes and red-light runners have been recorded at the SR 6 intersections with Welcome All Road, Enon Road, and SR 154/Campbellton Road. In order to improve operations, the extension of the left turn lane at the Welcome All Road intersection and

the provision of turn lanes at the Enon Road intersection are recommended. As stakeholders in this study, representatives from the Airport West CID indicated that the CID would soon begin a study of the Welcome All Rd at SR 6 intersection area. Therefore, further coordination among stakeholders is recommended to address findings from that study. The red-light running issue could be related to signal timing; thus, an evaluation for signal retiming and additional operational analysis is recommended in order to discourage red-light running and improve operation of the intersection. Additionally, Fulton County public works staff should consider contacting law enforcement regarding the issue of red-light running.

Intersection Auxiliary Lane Analysis

Auxiliary lanes are a common treatment used to improve bottlenecks at signalized intersections; they typically have low to moderate costs, compared to other roadway improvements. Auxiliary lanes are additional through and/or right turn lanes that can be added to the right side of the roadway's approaches before the intersection; they typically taper off after the intersection. An example showing auxiliary lanes is shown in **Figure 4-17**.

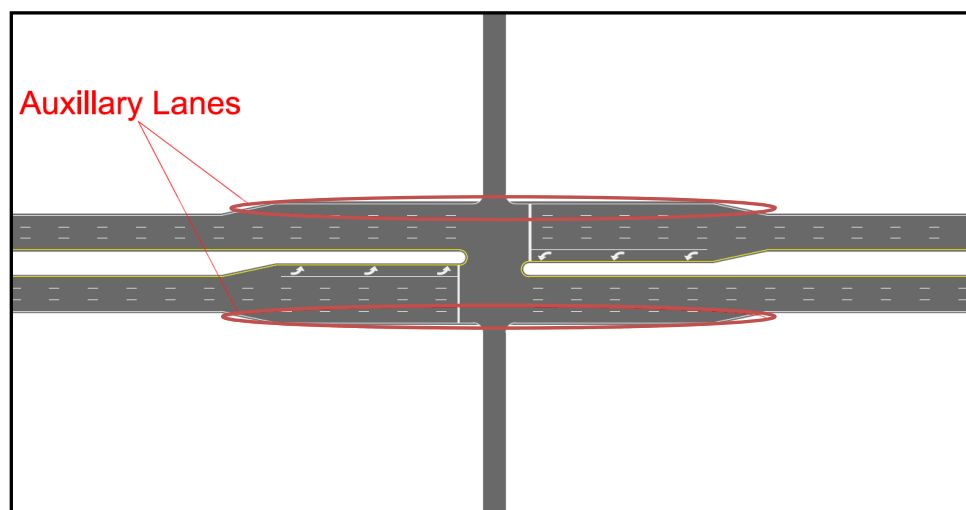


Figure 4-17: Auxiliary Lanes at an Intersection

The addition of auxiliary lanes serves two purposes. First, it allows more through vehicles to be processed through the intersection during a particular phase. This reduces delays for the through movements and allows extra time for serving other movements during the signal cycle. The second purpose is that it allows right-turning vehicles room to decelerate before making the turning movement. This lessens the impact to the through movement from right-turning vehicles and reduces the occurrence of rear-end crashes. Additionally, the extra lane after the intersection would give vehicles turning right on red from the minor street room to accelerate before merging with free-flowing mainline traffic. This treatment could be beneficial to areas along SR 6, particularly because of the high volumes and speeds experienced along the corridor. It is recommended that the need for installing auxiliary turn lanes be studied for all intersections throughout the study corridor. GDOT Regulations for Driveway and Encroachment Control (GDOT RDEC 2009) summarizes minimum requirements for right turn deceleration lanes and left turn lanes relative to

right turn volumes (RTV) and left turn volumes (LTV) based on ITE Trip Generation. The length of turn lanes can be also investigated for adequacy. Ideally, turn lanes should provide a full-width lane that is long enough to allow for vehicles to decelerate from the operating speed to a full stop in addition to the length of full-width lane that is needed to store vehicles waiting to turn. **Tables A-1** through **A-4** summarize design criteria for auxiliary turn lanes, including minimum volume requirements for right and left turn lanes and minimum storage length. The provision of auxiliary turn lanes at intersections would improve the operation of intersections and in turn help alleviate congestion of the SR 6 mainline traffic.

An example of how this could be applied was modeled for the intersection of SR 6 and SR 61/Nathan Dean Blvd. Here, about 400 feet of auxiliary lane was added before and after the intersection along SR 6, and modeled in Synchro with forecasted 2020 volumes and no signal timing changes. The resulting delay values are recorded in **Table 4-12** below.

Table 4-12: Synchro Results of Adding an Auxiliary Lane to SR 6 at SR 61/Nathan Dean Blvd

	Without Aux. Lanes	With Aux. Lanes	Improvement
Intersection Delay (s)	77.7	73.2	5.8%
EB Through Delay (s)	50	36	28.0%
WB Through Delay (s)	37	34	8.1%

These results suggest that the addition of auxiliary lanes could result in significant reduction in delay at the intersection. If the signal timing were to be adjusted to reflect these changes, even greater intersection-wide improvements may be achieved. This would be an ideal treatment at an intersection where 12 feet or more of right-of-way is available on either side of the roadway. However, while auxiliary lanes may improve the conditions at the intersection, the lane reduction after the intersection may create issues in some situations. It is possible that implementing auxiliary lanes could merely shift the bottleneck downstream of the intersection and the backups from the downstream bottleneck could block the intersection. Additionally, by increasing the width of the roadway, it would increase both the distance needed for a pedestrian to cross and the pedestrian interval. For the auxiliary lane to be effective, it is also very important that the drivers of the through vehicles perceive the benefit of the extra lane. If they do not, they will not use the lane, diminishing its capacity improvement. A detailed traffic study is recommended before consideration of this type of treatment.

One of the key benefits to the auxiliary lane is that it allows a space for the deceleration and acceleration of vehicles without overly impacting through traffic. There is another way to achieve this that does not require any new pavement. There are sections in Hiram, particularly along westbound SR 6, that feature a continuously paved right lane that is marked for individual right turn movements into and out of driveways. An aerial image of this configuration is shown in the top portion of **Figure 4-18** below.

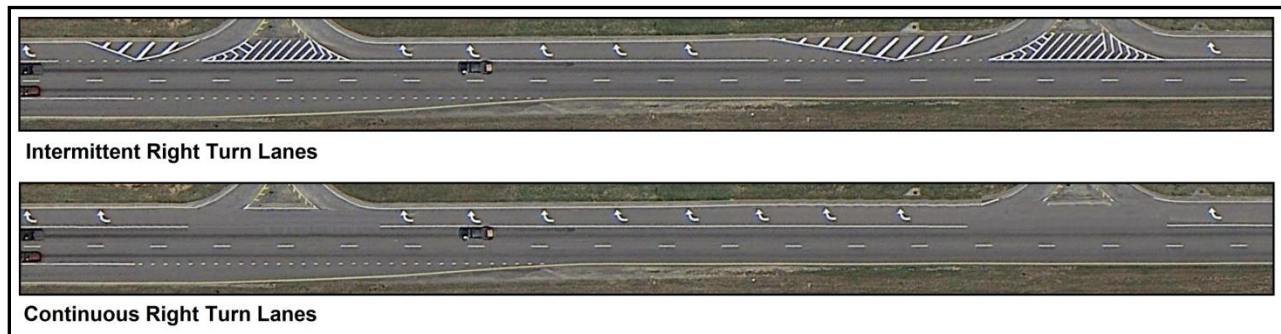


Figure 4-18: Intermittent & Continuous Right Turn Lanes

A potential concern with the configuration shown in the top image of **Figure 4-18** is that it may not always provide the most comfortable spacing for deceleration, thereby requiring drivers to either decelerate heavily once they are in the lanes, or begin to decelerate before they move into the lane. Also, the shorter acceleration lanes can cause forced merges with high-speed vehicles, because the merging vehicles do not have enough space to comfortably merge with through traffic. One way to mitigate this would be to improve this area to have a continuous right turn lane, rather than the many segmented deceleration and acceleration lanes. This type of configuration is shown in the bottom image of **Figure 4-18**. With this configuration, there is more room and flexibility for motorists to accelerate and decelerate, resulting in increased driver comfort and therefore improved accelerations and decelerations. It would be important to consider the traffic volumes entering and exiting the driveways before applying this type of treatment. This solution would be ideal in locations where the driveway volumes are relatively low compared to the through movements on SR 6. This application may only be appropriate in certain situations, however, like where low driveway spacing creates a greater concentration of conflict points between the accelerating and decelerating vehicles or where heavy volumes in and out of the driveways provide more opportunities for vehicle conflicts. It is important to consider the unique characteristics of any location before applying a treatment such as this.

Re-Open Merk Road Just North of SR 6

There was also discussion of reopening Merk Road just north of SR 6, bringing this intersection back to a four-leg intersection at the stakeholder meetings. If reopened, Merk Road would provide a direct connection to Butner Road and easier access to SR 154/Campbellton Road and I-285 interchange to the north via Butner Road. However, the roadway may have been closed due to safety, sight distance, and/or low turning volumes, so consideration of these and other possible factors would need to be fully explored.

Blairs Bridge Road/Interstate W Parkway Intersection Study

Stakeholder feedback indicated that the intersection of SR 6 and Blairs Bridge Road/Interstate W Parkway currently experiences high left and U-turn movements from the eastbound approach possibly for access to the Walmart Supercenter. However, the current data available during this study did not show significant

congestion at this location. Therefore, further investigation of an intersection operational study is recommended at this location.

Perform a traffic engineering study to evaluate options to improve SR 6 at Garrett Road intersection

Although this intersection is included within the limits of existing programmed projects, additional in-depth traffic engineering study could be beneficial to evaluate the best possible intersection design for this unique location due to its heavy truck turning volumes associated with the intermodal terminal. For example, improved superelevation would allow the trucks to better turn onto and off of SR 6.

Provide a median barrier on SR 6 between Welcome All Road and SR 70/FIB

Stakeholders indicated that drivers often cross the median in this section of SR 6. A physical median barrier would encourage drivers use the intersections for making turns instead of crossing the median.

Provide intersection improvements at Butner Rd at SR 6

Intersection improvements including turn lanes and signal upgrades are recommended based on existing and future conditions analysis and stakeholder comments regarding need for pedestrian accommodations at this location. This intersection was identified as having existing PM peak hour LOS E and is forecasted to have failing LOS in the future baseline condition (2020). Heavy southbound traffic on Butner Road backs up causing significant delays in passing through the SR 6 intersection. Additionally, the Wolf Creek Nature Trail located on the east side of Butner Road ends prior to this intersection and does not currently provide connectivity from the north to the south side of SR 6.

4E.2. Operational Improvements based on Crash Analysis

As analyzed in Chapter 2 (Existing Conditions), four segments in the study corridor were identified as crash hotspots that exceed statewide average rates for all five categories: fatal crashes (defined as crashes that involve at least one fatality), total fatalities, injury crashes (defined as crashes involving at least one injury), total injuries, and all crashes. These segments include Airport Drive to Washington Road (1.5 miles), Washington Road to Princeton Lakes Parkway (1.5 miles), I-20 to Skyview Drive (0.5 miles), and Old Harris Road to South Main Street (1.1 miles).

Among these segments, the segment between Washington Road and Princeton Lakes Parkway in Fulton County and the segment between Old Harris Road and S Main St in Paulding County showed the highest crash rates. The injury crash rate, injury rate, and overall crash rate were 10 to 12 times higher than the statewide averages in the segment between Washington Road and Princeton Lakes Parkway. The fatality crash rate and fatality rate in the segment between Old Harris Road and S Main St were 10 to 11 times higher than the statewide averages.

Based on these preliminary analysis results, it is recommended that in-depth roadway audit studies be conducted for the identified crash hotspots in order to pinpoint specific issues. **Table 4-13** provides a summary of the potential improvements or considerations along the corridor.

Table 4-13: Operational Improvements along Corridor based on Crash Analysis

Potential Improvement	Issue/Concern	Description of Improvement
Conduct an in-depth roadway audit study between Airport Drive and Princeton Lakes Parkway	Among the highest crash rates recorded within the whole study area	An in-depth roadway audit study would pinpoint specific issues.
Examine the feasibility of restricting access from Publix onto Princeton Lakes Parkway in Camp Creek Marketplace area	Weaving issues due to the proximity of Publix intersection to SR 6	Restricting direct access from Publix onto Princeton Lakes Parkway would improve operations along Princeton Lakes Parkway near SR 6 by removing weaving movements and potentially improving the operation of the SR 6 intersection with Princeton Lakes Parkway.
Investigate operational improvements and law enforcement strategies along corridor between Welcome All Road to Bakers Ferry Road	High crash rates and presence of red-light runners	In order to improve operations, the extension of the left turn lane at the Welcome All Road intersection and the provision of turn lanes at the Enon Road intersection are recommended. Signal retiming and additional operational analysis, coupled with law enforcement, would discourage red-light running.
Conduct an in-depth roadway audit study between I-20 and Skyview Drive	High crash rates	An in-depth roadway audit study would pinpoint specific issues.
Conduct an in-depth roadway audit study between Old Harris Road and S Main Street	High crash rates	An in-depth roadway audit study would identify specific issues.

4E.3. Alternative Intersection Designs

By reviewing existing and future baseline conditions, approximately one-third of the SR 6 intersections will operate at a failing LOS by 2020 for either the AM or PM peak hour. The following intersections in each county are expected to operate at failing level of service:

- N. Commerce Drive, Butner Road, Westlake Parkway, SR 70/FIB, and Bakers Ferry Road (Fulton)
- Riverside Parkway, Bob Arnold Drive, I-20 EB ramps, Skyview Drive, Maxham Road, and US 78/Veterans Memorial Highway (Douglas)
- Garrett Road and Richard D Sailor Parkway (Cobb)
- Isley Stamper Road, Cleburn Parkway/Poplar Springs Road, Target/Best Buy, SR 92, Old Mill Road, Bill Carruth Parkway, Paris Road, Nathan Dean Blvd, and S Main Street (Paulding)

Table 4-14 provides a summary of the potential locations for alternative intersection design considerations along the corridor.

Table 4-14: Alternative Intersection Design Considerations along Corridor

Potential Improvement	Issue/Concern	Description of Improvement
Complete a traffic engineering study to evaluate the feasibility of installing an alternative intersection design SR 6 and Maxham Road intersection	Congestion	Preliminary results indicate that a CFI, PFI, or modified QR intersection are feasible alternative intersection configurations. A further in-depth study for operations and constructability for these options is recommended.
Complete a traffic engineering study to evaluate the feasibility of installing an alternative intersection design at the SR 6 and Veterans Memorial Highway intersection	Congestion	Preliminary results indicate that a CFI, PFI, or a grade separation are feasible alternative intersection configurations. An intersection/interchange design study and lighting review is recommended for this location.

Possible alternative intersection designs considered for these intersections and diagrammatic representations and their related access management considerations are included in **Table E-5** and **Table E-6 (Appendix E)**. All of the alternative intersection designs remove at least one of the conventional left turn movements at a major intersection, which has the advantage of fewer signal phases and associated shorter cycle lengths, shorter delays, and higher capacities compared to conventional intersections. **Table 4-15** provides a summary of the planning feasibility assessment of alternative intersection designs at these failing intersections. Four different alternative intersection design options were considered: CFIs, including displaced left turn (DLT) and crossover displaced left turn (XLT); median U-turn (MUT) intersections or Michigan lefts (MLs); RCUT intersections or superstreets; and QR intersections.

The intersections of SR 6 with Maxham Road and Veterans Memorial Highway are discussed in detail in the section below due to their failing LOS and highlighted concern from stakeholders.

Congestion at Intersection of SR 6 and Maxham Road

The intersection of Maxham Road and SR 6 (Thornton Road) is located approximately 1.3 miles north of the I-20 interchange in Douglas County. It is currently signalized with protected left turn phases and crosswalks on all approaches and operates at failing LOS during the PM peak period. The 2013 annual average daily traffic (AADT) volume was 59,740 on SR 6 west of the intersection and 26,790 for Maxham Road south of the intersection. The AADT on SR 6 west of Veterans Memorial Highway was recorded as 32,550 in 2013, indicating that SR 6 AADT nearly doubles as it approaches the Maxham Road intersection. All four quadrants of the intersection are well developed with retail/commercial establishments in each quadrant. GDOT currently has a project (PI 0012621) programmed for Maxham Road from SR 6 to Tree Terrace Parkway, which is aimed at congestion reduction and traffic flow improvements at the SR 6 at Maxham Road intersection through minor widening, lane change assignments, and the elimination of weaving to help reduce traffic congestion in this area. The project also includes proposed sidewalks along the road serving two major apartment complexes that provide direct pedestrian access to the retail commercial area. The possibility of a mixed-use development in the area was also mentioned at the initial stakeholder meeting. Stakeholders also mentioned a previous long-range project to extend Maxham Road to N Blairs Bridge Road, which had been considered but has not progressed to planning or design stages.

A preliminary analysis of existing and future year (2020) traffic conditions was completed for the SR 6/Maxham Road intersection. As indicated, the operational results for the intersection indicate that both

the CFI and QR intersections are applicable options. The construction of either a CFI or QR at this intersection would have high right-of-way and overall costs due to the developed nature of all existing quadrants. As such, the relatively new parallel-flow intersection (PFI) and the option of a modified quadrant design, which utilizes the existing road network, could also be considered.

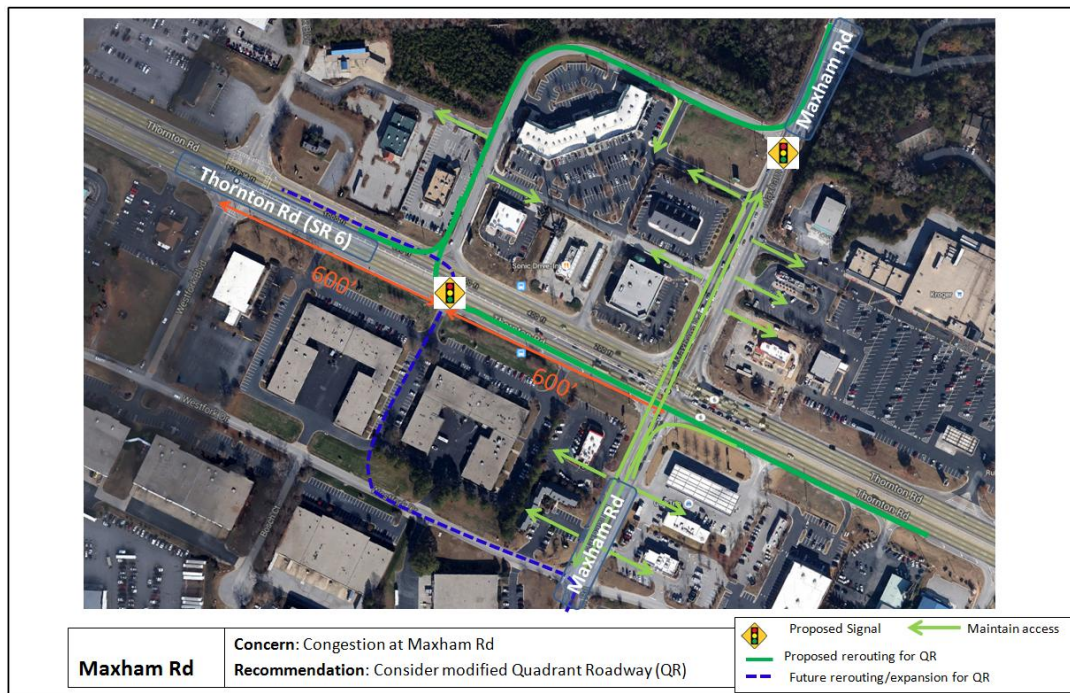


Figure 4-19: Maxham Road – Modified Quadrant Roadway

As shown in **Figure 4-19**, the heavy southbound left turn movement, as well as the southbound right turn from Maxham Road to SR 6 could be routed through the existing roadway in the northwestern quadrant of the intersection with a conversion of the existing right-in-right-out driveway to SR 6 into a signalized median crossover. This design would result in a new signalized intersection, which would be approximately equidistant at 600 feet from the adjacent signalized intersections at Maxham Road and Westfork Blvd. Although this intersection would not meet the GDOT RDEC minimum requirement of 1,000-foot spacing for urban settings, the benefits in operational improvements at the Maxham Road intersection could support the cause for an exception, pending a more detailed traffic study. The existing northbound left turn volume at the main Maxham Road intersection indicates that the protected phase could be reconfigured to a protected/permissive phase or eliminated and reconfigured as a permissive phase with the removal of the dual southbound left movement, thus freeing green time in the cycle, which could be allocated to the through movements. If future northbound left turn volumes warrant a protected phase, there is the option to route them on the QR route shown in dotted blue, which utilizes a portion of Westfork Drive and new construction. It is important to note that this extension option would also allow a transition to a superstreet-based concept where all Maxham Road traffic could be diverted through the

quadrant roadway in the event that the quadrant development characteristics change in the future with more dense retail development. Under the current intersection design and existing conditions where retail/commercial developments exist in all quadrants, the through movements on Maxham Road need to be maintained to provide continued access to the adjacent businesses.

Congestion at Intersection of SR 6 and Veterans Memorial Highway (Bankhead Highway)

The intersection of Veterans Memorial Road (US 78) and SR 6 (Thornton Road) is located approximately 2.6 miles north of the I-20 interchange in Douglas County. The intersection has developed quadrants (see **Figure 4-20**). The County currently has a redevelopment plan for Veterans Memorial highway between S Sweetwater Road and the Cobb County line. The 2013 annual average daily traffic (AADT) volume on SR 6 just west of the intersection is 32,550 with 10 percent trucks. Veterans Memorial Highway has an AADT of 14,700 with 7 percent trucks for the southbound approach and 14,170 with 7 percent trucks for the northbound approach.

This intersection currently experiences high congestion (LOS D and E for the AM and PM peak periods, respectively) and is located in a segment with crashes above the statewide average. It is a signalized intersection with protected left turn phases, channelized right turns, crosswalks, and pedestrian signals on all approaches. The intersection currently operates at a failing LOS during both peak periods. The crash analysis also reveals that rear-end crashes are common at this intersection.

As such, the alternative intersections described in Appendix E were also considered for this intersection. Additionally, three grade-separation treatments (the split intersection, echelon interchange, and center left-turn) were considered. These options are arterial interchanges that can result in free flow to the mainline movement but can be designed to fit into narrow rights-of-way and non-freeway settings. Generally, grade-separation treatment is a costly option. It affects adjacent land use, pedestrians, and cyclists; has substantial traffic impacts during construction; and is usually considered when at-grade intersections are no longer feasible.

Arterial interchanges at this location could improve operations while reducing congestion. A CFI design is also feasible for this intersection, as indicated by the preliminary analysis. It is therefore recommended that a traffic engineering study to assess the feasibility of a CFI, PFI, and an arterial interchange design be completed for the intersection of SR 6 and Veterans Memorial Highway. A lighting review of the intersection is also recommended.



Figure 4-20: Veterans Memorial Highway Intersection

Table 4-15: Alternative Intersections Matrix for Failing Intersections

Intersection	Applicable Conditions	Fulton					Douglas						Cobb		Paulding								
		N Commerce Dr	Butner Rd	Westlake Pkwy (Unsig)	SR 70/FIB	Bakers Ferry Rd (Unsig)	Riverside Pkwy	Bob Arnold Dr (Unsig)	I-20 EB Ramps	Skyview Dr	Maxham Rd	US 78/ Veterans Memorial Hwy	Garrett Rd	Richard D Sailor Pkwy	Isley Stamper (Unsig)	Cleburn Pkwy/ Poplar Springs	Hiram Pavillion/ Target/Best Buy	SR 92	Old Mill Rd (Unsig)	Bill Carruth Pkwy	Paris Rd (Unsig)	SR 61/ Nathan Dean Blvd	S Main St (Unsig)
CFI/DLT/XLT	V/C ratio > 0.8 on two opposing approaches	Y	Y				Y			Y	Y	Y				Y	Y	Y	Y	Y	Y	Y	
	Cross product of LT and opposing through veh > 150,000 on two opposing approaches	Y	Y		Y		Y	Y		Y	Y	Y		Y		Y	Y	Y		Y		Y	
	LT volume > 250 veh/hr/ln and opposing through volume > 500 veh/hr/ln on two opposing approaches		Y		Y													Y		Y			
	Intersection heavily congested with many signal failures	Y	Y		Y		Y			Y	Y	Y	Y	Y		Y		Y		Y			
	LT queues at an intersection spill beyond LT storage bays	Y					Y		Y	Y	Y	Y		Y		Y	Y	Y		Y			
MUT/ML	LT volume/total approach volume is less than 0.2 on all intersection approaches		Y									Y			Y								
	LT volume < 400 veh/lane, and opposing through volume > 700 veh/lane on two opposing intersection approaches																						
	V/C ratio > 0.8 on two opposing approaches	Y	Y				Y			Y	Y	Y				Y	Y	Y	Y	Y	Y	Y	
	Cross product of LT and opposing through veh > 150,000 on two opposing approaches	Y	Y		Y		Y	Y		Y	Y	Y		Y		Y	Y	Y		Y		Y	
	Intersection heavily congested with many signal failures	Y					Y		Y	Y	Y	Y		Y		Y	Y	Y		Y			
RCUT/ Superstreet	Heavy through volumes and LT volumes on major road approaches													Y									
	The ratio of the minor road approach volume to the total intersection approach volume < 0.20	Y	Y	Y		Y		Y	Y				Y	Y	Y		Y			Y		Y	
	The mainline left-turning volume/lane > 80% of the minor road traffic/lane that would move concurrently during the same signal phase	Y			Y	Y		Y				Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Intersection heavily congested with many signal phase failures for through and left- turn traffic on major road	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
QR	Heavy through volumes	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y		Y
	One high left-turn volume	Y	Y		Y			Y	Y		Y	Y		Y						Y		Y	
	Moderate or low-left-turn volume as there is increase in distance for left turning vehicles. May be applicable to low u-turn volumes		Y	Y		Y							Y		Y		Y			Y		Y	
	Empty or redeveloping quadrant - available right of way	Y	Y	Y	Y	Y	Y					Y	Y	Y	Y	Y			Y		Y	Y	Y
	Nearby signals; reduces cycle length at main intersection	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Future plans for grade separation																						
	Skewed intersection						Y			Y									Y				Y

*Source for applicable conditions: Alternative Intersections/Interchanges Informational Report (AIIR, FHWA)

**"Y" denotes meeting condition

4E.4. Frontage Roads

Providing frontage roads (service roads) parallel to SR 6 can be an effective access management strategy. These frontage roads can facilitate access to private properties while separating them from the principal roadway. This strategy would encourage short, local trips to reach their destinations without accessing SR 6 and in turn could improve the operations of SR 6. This strategy would also provide alternative routes to SR 6 and an opportunity for the drivers to detour when necessary.

In addition to the stakeholder input, the study corridor was evaluated to identify potential frontage roads and alternative routes to SR 6. **Figure 4-21** shows locations of the possible frontage roads and parallel facilities to SR 6 for future consideration. Green dotted lines indicate existing facilities, and red dotted lines indicate areas where either construction or upgrade of the facilities may be required for use as alternate routes. Some of these roads seem to primarily serve residential areas, thus an in-depth feasibility study should precede any further consideration of these roads as parallel facilities to SR 6. Signage could be also provided to promote the use of these alternative routes. Based on stakeholder input, the possible connectivity of Six Flags Road between Interstate Parkway (Bob Arnold Blvd) and Blairs Bridge Road (Interstate W Parkway) with an extension to provide access to I-20 was evaluated. Preliminary feasibility analysis, however, indicates that a direct connection between Six Flags Road and I-20 is not possible without impacting the existing Walmart and Mitsubishi Motors.

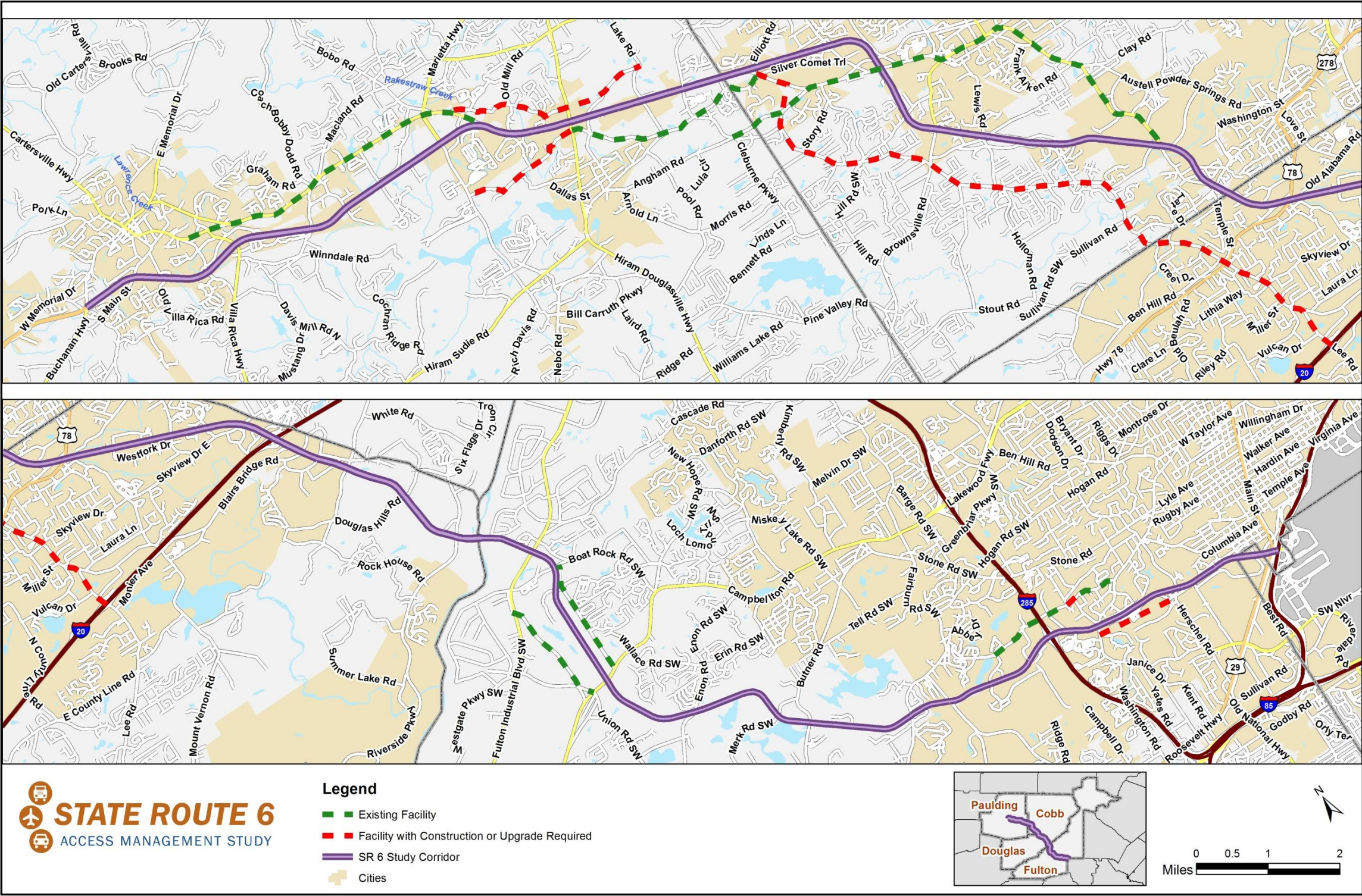


Figure 4-21: Potential Frontage Roads and Parallel Facilities – Corridor-Wide

Frontage Roads in the Hiram Commercial Area

One of the most effective means of improving mobility and congestion on SR 6 is to reduce demand on the mainline. Multiple trips are common in areas with mixed-use developments, as seen along most of the SR 6 corridor. Providing inter-parcel access through the mixed-use development may reduce additional trips on the mainline and may reduce the overall operational impacts of development.

Most of the existing mixed-use developments in the Hiram commercial area have reasonable internal connectivity. For example, there is an existing frontage road running parallel to SR 6 on the south side of the highway between Poplar Springs Road and Depot Drive. This road allows shoppers to travel within these developments without having to access SR 6. However, on the north side of SR 6, there is no such connecting road. There are a few possibilities for establishing such connectivity that will be discussed in the following section. There is potential to provide a connection all the way from Poplar Springs Road to SR 92 by connecting a few existing roads. One such example would be to connect Lake Road from Greenfield Road to Poplar Springs Road. Existing and potential frontage roads are shown in **Figure 4-22**.

Frontage/Backage Road Connectivity in Hiram

In the Hiram Commercial district, the developments on the south side of State Route 6 include a fully connected frontage/backage road form SR 92 to Poplar Springs Rd. This connectivity allows for access between parcels, without forcing drivers back on to SR 6. In addition to being more convenient for the driver, it reduces traffic volumes on the main road, improving operations. In addition, businesses may benefit because of increased visibility from potential customers passing closer to store fronts at low speeds.

On the north side of SR 6, there is no such continuous frontage/backage road. It can be seen below that there are several segments of roadway throughout the developments on this side of the road that meet this function. If they were connected by new roads (shown in red below), the entire area from SR 92 to Poplar Springs Rd. would be served. The new segments of roadway would need to be from Lake Rd to Best Buy, and from Brusters Ice Cream to Meineke Car Care.



Figure 4-22: Frontage Road Connectivity in Hiram

4E.5. Quadrant Connectivity

Quadrant connectivity refers to the use of a connector roadway located in one of the quadrants at an intersection to relocate mainline left-turn movements. Quadrant roadways are most effective at intersections with empty or redeveloping quadrants with minimal right-of-way costs. Most of the signalized intersections within the study limits currently have existing development in their respective quadrants. In addition to the modified quadrant roadway for Maxham Road intersection earlier described, intersections identified as having a future potential for quadrant connectivity are highlighted in this section and listed below. It is recommended that quadrant roadways be considered during future development near these intersections:

- Riverside Parkway
- Factory Shoals Road
- Butner Road
- Douglas Hill Road

Quadrant Connectivity at Riverside Parkway

The intersection of Riverside Parkway is signalized with crosswalks and pedestrian signals on all approaches and currently operates at acceptable LOSs during both peak periods. An aerial view of the intersection is shown in **Figure 4-23**.

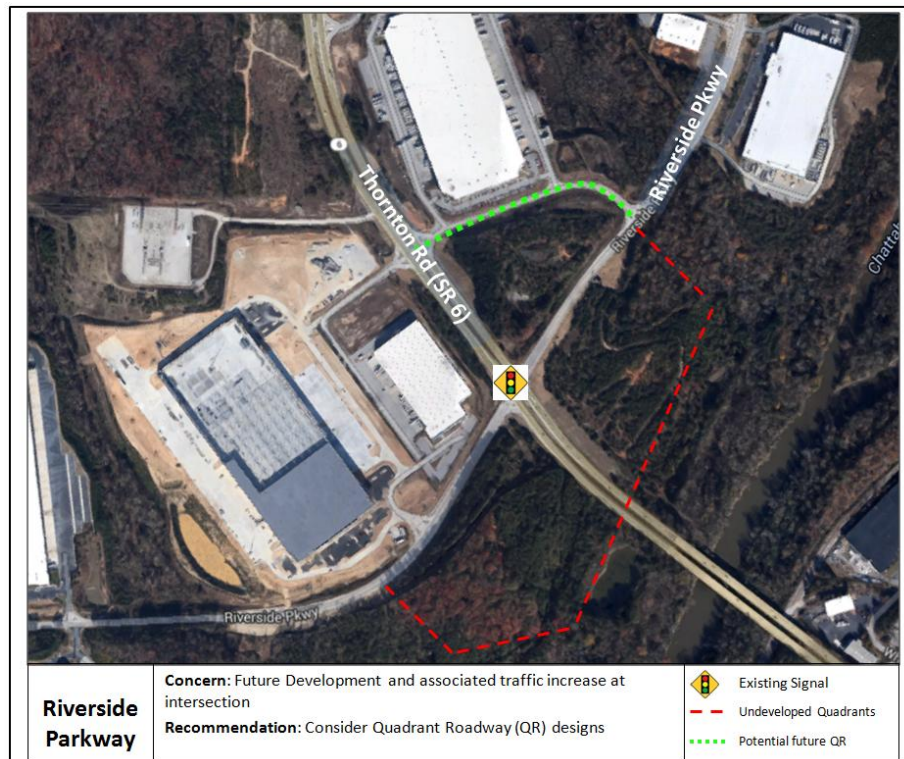


Figure 4-23: Riverside Parkway – Potential for Future Quadrant Roadways

Industrial and other development, and associated increased traffic, is expected in the area. Industrial opportunities are strengthened by close proximity to the Fulton Industrial area, although roadway connections across the Chattahoochee River are limited. The northeastern and southeastern quadrants of this intersection are currently undeveloped. There is an existing road that connects Riverside Parkway to an unsignalized median crossover north of the intersection that has potential for use as a quadrant roadway in the future. A quadrant roadway at this location could alleviate congestion at the intersection and improve the flow of through traffic on SR 6. Therefore, it is recommended that quadrant roadways be considered in future zoning and development approvals at this intersection.

Quadrant Connectivity at Factory Shoals Road

At the time of this report, a zoning hearing and a site plan stipulation and amendment are underway for a FedEx distribution center along Factory Shoals Road at its intersection with Bob White Road, located about 3,700 feet north of the Factory Shoals Road intersection with SR 6. If the zoning permit is issued by Cobb County, there is a possibility that additional truck traffic would use the SR 6 corridor to access I-20. Road widening or improvements at Factory Shoals Road/Six Flags may be needed to accommodate trucks from the distribution center. However, no additional improvements are provided because the zoning permit has not yet been approved (as of the time of this study). It is noted that there is very limited development around this intersection today, so it has the potential for future quadrant connectivity. **Figure 4-24** shows an aerial view of this intersection.



Figure 4-24: Factory Shoals Road – Potential for Future Quadrant Roadways

Quadrant Connectivity at SR 92

It was suggested during Stakeholder Meeting #2 that SR 92 would be a good candidate for quadrant roadways. However, the addition of new roadways could be a challenge since all quadrants of the SR 92 intersection feature existing developments as shown in **Figure 4-25**. The right-of-way constraints at this location would make the installation of quadrant roadways highly difficult and likely infeasible.



Figure 4-25: SR 92 Intersection

Quadrant Connectivity at Butner Road and Douglas Hill Road

Additional SR 6 intersections with undeveloped quadrants that could benefit from future quadrant roadway designs include Butner Road and Douglas Hill Road, which are highlighted in **Figure 4-26**.

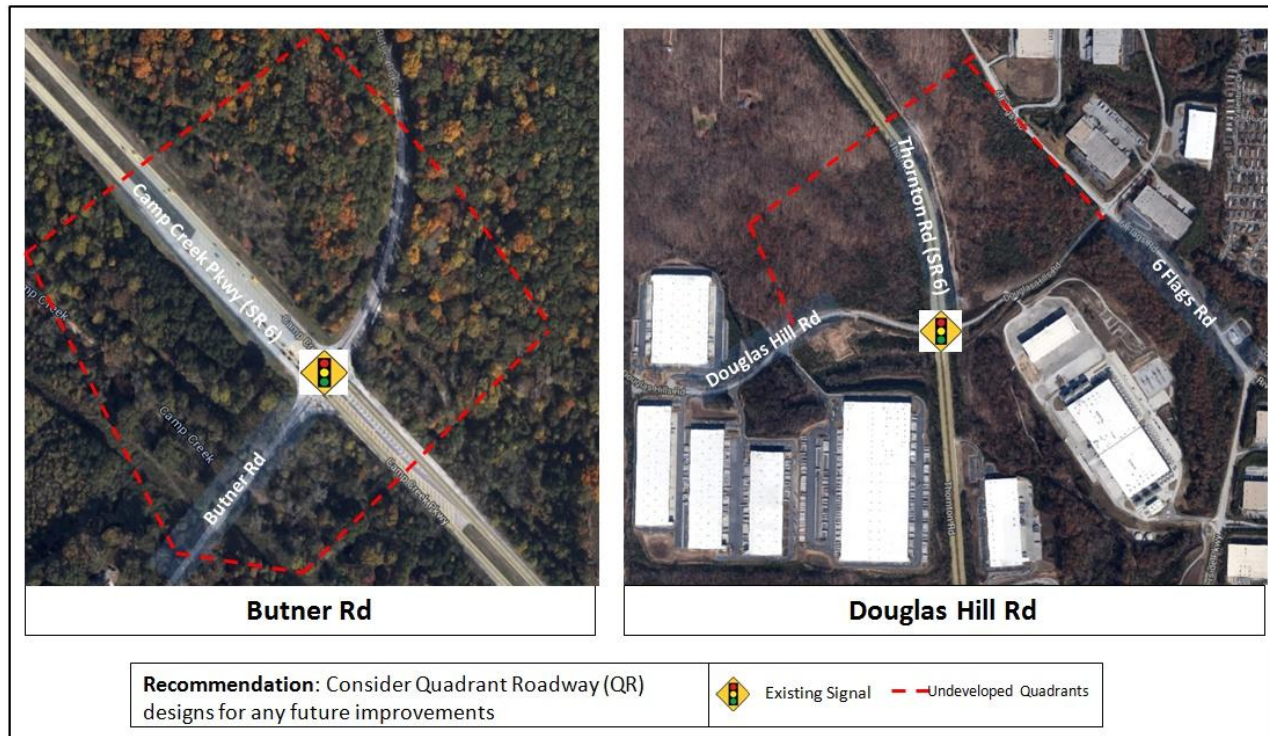


Figure 4-26: Butner Rd and Douglas Hill Rd Intersections – Potential for Future Quadrant Roadways

4F. Corridor-Wide Considerations for Pedestrians, Bicycles, and Transit Users

Although the SR 6 study area primarily serves motor vehicles, pedestrian and bicycle accommodations are needed in some areas, especially dense commercial areas and areas near transit facilities. **Table 4-16** provides a summary of the potential locations for pedestrian, bicycle, and transit improvements along the corridor.

Table 4-16: Potential Pedestrian, Bicycle, and Transit Improvements

Potential Improvement	Issue/Concern	Description of Improvement
Improve pedestrian facilities through provision of sidewalks in Camp Creek Marketplace area	Pedestrian access	Pedestrian facilities should be improved in order to accommodate high pedestrian activities in the area. The locations in need of additional sidewalks and crosswalks should be investigated.
Improve facilities for pedestrians, bicyclists, and transit users between Old Fairburn Road and Butner Road	Pedestrian concerns and need for a multi-use path	Pedestrian accommodations should be added or expanded in order to provide improved pedestrian environments near the SR 6 intersections with Old Fairburn Road and Butner Road. In addition, a multi-use path parallel to SR 6 would be provided between these two intersections separated from the roadway.
Improve pedestrian facilities between I-20 and Maxham Road through provision of sidewalks	Pedestrian access	Sidewalks and crosswalks could be added or expanded. Regulatory pedestrian signs should be installed and effective pedestrian signal timing should be provided at intersections. Landscaping efforts along the median should also be considered to help promote safe crossing.
Improve pedestrian facilities on Powder Springs-Dallas Road and at Richard D Sailors Parkway and Florence Rd (near GRTA Park and Ride Lot)	Pedestrian access	Addition of sidewalks and pedestrian friendly intersections along Powder Springs-Dallas Road would provide improved pedestrian environments for transit users.

Due to the high speeds of vehicles on SR 6, crossing outside of crosswalks is especially dangerous for pedestrians in this corridor. The GDOT Pedestrian and Streetscape Guide (PSG) states that pedestrians struck by a vehicle traveling at 20 miles per hour have a 5 percent chance of being killed. If that speed is increased to 40 miles per hour, then the chance of a pedestrian being killed increases to 85 percent. As indicated in Chapter 2 (Existing Conditions), approximately 55 percent of the intersections in the study corridor have crosswalks provided on at least three legs, and 36 percent of the intersections have crosswalks provided on all legs. Safe pedestrian crossing can be encouraged in two primary ways: (1) through the provision of well-designed sidewalks and crosswalks that are properly signed to direct pedestrians and (2) by deterring pedestrian crossings at midblock through signage and physical barriers to crossing in the median (using raised medians or landscaping, for example). Sample signs are shown in **Figure 4-27**.

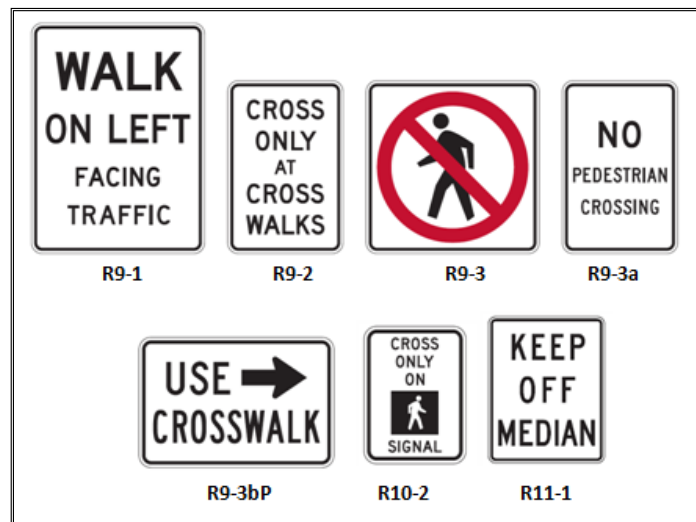


Figure 4-27: Sample Regulatory Pedestrian Signs from MUTCD

Ideally, crosswalks should be provided at all signalized intersections with sidewalks also provided to guide pedestrians to the crosswalks nearby. Sidewalks and crosswalks should also be provided near all transit stops to accommodate pedestrian activities and promote safe crossings. For any new developments and highway projects, sidewalks and crosswalks should be considered as standard elements. Regulatory pedestrian signs to deter pedestrian crossings at midblock and effective pedestrian signal timing at crosswalks should be provided.



Figure 4-28: Median Landscaping Example

Median landscaping can promote safe crossing activities by encouraging pedestrians to use crosswalks rather than crossing mid-block. GDOT policy requires any shrubs in the median to be no taller than 30 inches if they are within horizontal clearance zone. Trees can be placed in medians provided they are not in the horizontal clearance zone. If a tree is placed in the median, it must be limbed up to at least 7 feet from the ground. See GDOT Policy 6755-9 – Policy for Landscaping Enhancements on GDOT Right of Way for more information. For most urban settings, as in the case of SR 6, medians are often just concrete curbs. However, to promote pedestrian safety in areas where pedestrians cross or walk in medians, landscaping with shrubs or trees, and possibly guardrail, should be considered. An example showing how landscaping can make a median non-traversable is depicted in **Figure 4-28**.

The following sections summarize the specific locations that could benefit from pedestrian facility improvements along SR 6 within each county.

In addition to the recommended pedestrian improvements for the Camp Creek Marketplace subarea in Fulton County, pedestrian facility improvements at the SR 6 intersections with Old Fairburn Road and

Butner Road are recommended. A multi-use path parallel to SR 6 could be also provided between these two intersections separated from the roadway and could connect with existing trails in the area. Since both Old Fairburn Road and Butner Road have MARTA bus routes to the north of SR 6, providing pedestrian facilities between these roads would improve access to these transit routes. The stakeholders expressed concerns about pedestrians crossing Butner Road at the SR 6 intersection and support for the possibility of providing a multi-use trail crossing near the SR 6 intersection with Butner Road. The City of College Park is planning to build a multi-purpose bridge for pedestrians, bicycles, and golf carts crossing Camp Creek Parkway to the Metropolitan Atlanta Rapid Transit Authority (MARTA) train station. These pedestrian facilities are not only geared towards improving pedestrian safety, they also encourage more pedestrian activities and in turn have a positive impact on local businesses.

Stakeholders also indicated concerns in the section between I-20 and Maxham Road in Douglas County. This corridor section has a concrete median, 18 feet wide between intersections and 6 feet wide at intersections. There are no sidewalks in the area and an observed issue of pedestrians walking along the median. Within this 1.5-mile section, there are four signalized intersections in addition to the interchange ramps, each with crosswalks and pedestrian signals on all approaches. There are also four MARTA bus stops within the section, and existing transit stops indicate pedestrian activity along certain sections of the corridor. GDOT has guidelines to identify crosswalk locations in central business districts or in urban settings with low speeds. At this time, there are no guidelines for placement of crosswalks along suburban and rural settings with high speeds.

This study recommends that crosswalks with pedestrian signals be provided at all signalized intersections along the corridor. Additionally, effective pedestrian signal timing, signs for crosswalks, and the implementation of measures prohibiting pedestrian activity on medians should be provided. Pedestrians will be more likely to use the crosswalks once they know they will have a well-timed phase, thus reducing their tendency to walk along and across medians. Additional landscaping efforts, as seen in **Figure 4-28**, could be considered to deter unsafe and illegal mid-block crossing and median walking.

Currently, the GRTA park-and-ride lot located along Power Springs–Dallas Road near Florence Rd and Richard D Sailors Parkway in Cobb County does not have pedestrian facilities associated with it. There are several residential communities in the vicinity that would benefit from the addition of sidewalks and pedestrian-friendly intersections along Powder Springs Dallas Roads. Although this roadway is not directly included in the study area, due to its vicinity to the SR 6 corridor, it is recommended that it be considered for pedestrian upgrades.

An immediate need for SR 6 in Paulding County is the installation of sidewalks. Currently, there are no sidewalks, and pedestrians have been observed to walk along the side of the road. Although there are no sidewalks, there are crosswalks at most signalized intersections along the corridor. As discussed earlier, it is recommended that sidewalks be provided to guide pedestrians to the nearby crosswalks.

As discussed in Chapter 2 (Existing Conditions), the ARC Bicycle Transportation and Pedestrian Walkways Plan rated the SR 6 corridor extremely low in terms of bicycle road conditions. In order to improve

accommodations for bicycle users in the study corridor, it is recommended that dedicated bicycle lanes be considered along with pedestrian facilities in the areas with higher pedestrian and biking activities. Some of these potential locations include the Camp Creek Marketplace area, the Silver Comet Trail area, transit stations, and park-and-ride lots. It is also important to note that the GDOT Design Policy Manual (Chapter 9 – Complete Streets Design Policy) states that accommodations for bicycles and pedestrians should be integrated into roadway new construction and reconstruction projects through design features appropriate to the context and function of the transportation facility, the design and construction of new facilities should anticipate likely demand for bicycling and pedestrian facilities within the design life of the facility, and the design of intersections and interchanges should accommodate bicyclists and pedestrians in a manner that addresses the need for bicyclists and pedestrians to safely cross roadways, as well as travel along them

4G. Corridor-Wide Freight Considerations

The SR 6 corridor generally has moderate to high truck volumes. Norfolk Southern's John Whitaker Intermodal Terminal, near Clarkdale between Austell and Powder Springs, located along the eastern edge of SR 6 in Cobb County, is one of the biggest truck trip generators along the corridor. Stakeholders indicated that trucks headed to and from the Intermodal Terminal can experience difficulty turning at SR 6 Spur/Garrett Road and SR 6 intersection.

To accommodate the high volume of truck traffic in this area, GDOT has two projects currently underway: SR 6 Congestion Reduction and Traffic Flow Improvements and Truck Friendly Lanes. Both projects extend from I-20 in Douglas County to Garrett Road in Cobb County. These projects are intended to address several important issues. Trucks experience unreliable travel times along SR 6 from I-20 to the Intermodal terminal. Also, the corridor presents operational concerns due to the combination of truck and automobile traffic. Weaving/lane changes northbound in advance of the US 78 intersection create operational concerns, as well as congestion. In addition, trucks enter SR 6 (turning left) from the Intermodal terminal at a banked section of SR 6 resulting in a potential for rollovers. In the portion of the corridor that has coordinated traffic signal, vehicles are not sensed along SR 6 for purposes of holding the green time, resulting in a "dilemma zone" for all users. This is the zone where drivers must decide whether to continue forward or stop when receiving a yellow indication. Conflicts can arise when an automobile makes the judgment to stop for a signal, but a following truck does not deem it possible to stop in that distance. Finally, visibility of traffic control and guidance is difficult for automobile drivers traveling on the mixed-use corridor. The congestion reduction and traffic flow improvements project currently underway will address these concerns with an extensive intelligent transportation system (ITS) network, traffic signal modifications, and median turn lane improvements. Subsequently, the truck friendly lanes project will provide wider lanes for trucks in the 2020-2030 timeframe.